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NORTH CAROLINA
AGRICULTURAL AND TECHNICAL
STATE UNIVERSITY

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GRADUATE
SCHOOL
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GRADUATE
SCHOOL
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1979-1980

Graduate School Office
Room 208—Dudley

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THE UNIVERSITY OF NORTH CAROLINA

Sixteen Constituent Institutions

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| Robert W. Williams, A.B., M.A., Ph.D., | <i>Associate Vice President— Academic Affairs</i> |

The University of North Carolina was chartered in 1789 and opened its doors to students at its Chapel Hill campus in 1795. Throughout most of its history, it has been governed by a Board of Trustees chosen by the Legislature and presided over by the Governor. During the period 1917-1972, the Board consisted of one hundred elected members and a varying number of *ex-officio* members.

By act of the General Assembly of 1931, without change of name, it was merged with The North Carolina College for Women at Greensboro and The North Carolina State College of Agriculture and Engineering at Raleigh to form a multicampus institution designated The University of North Carolina.

In 1963 the General Assembly changed the name of the campus at Chapel Hill to The University of North Carolina at Chapel Hill and that at Greensboro to The University of North Carolina at Greensboro and, in 1965, the name of the campus at Raleigh was changed to North Carolina State University at Raleigh.

Charlotte College was added as The University of North Carolina at Charlotte in 1965, and, in 1969, Asheville-Biltmore College and Wilmington College became The University of North Carolina at Asheville and The University of North Carolina at Wilmington respectively.

A revision of the North Carolina State Constitution adopted in November 1970 included the following: "The General Assembly shall maintain a public system of higher education, comprising The University of North Carolina and such other institutions of higher education as the General Assembly may deem wise. The General Assembly shall provide for the selection of trustees of The University of North Carolina. . . ." In slightly different language, this provision had been in the Constitution since 1868.

On October 30, 1971, the General Assembly in special session merged, without changing their names, the remaining ten state-supported senior institutions into the University as follows: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North

Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. This merger, which resulted in a statewide multicampus university of sixteen constituent institutions, became effective on July 1, 1972.

The constitutionally authorized Board of Trustees was designated the Board of Governors, and the number was reduced to thirty-two members elected by the General Assembly, with authority to choose their own chairman and other officers. The Board is "responsible for the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." Each constituent institution, however, has its own board of trustees of thirteen members, eight of whom are appointed by the Board of Governors, four by the Governor, and one of whom, the elected president of the student body, serves *ex officio*. The principal powers of each institutional board are exercised under a delegation from the Board of Governors.

Each institution has its own faculty and student body, and each is headed by a chancellor as its chief administrative officer. Unified general policy and appropriate allocation of function are effected by the Board of Governors and by the President with the assistance of other administrative officers of the University. The General Administration office is located in Chapel Hill.

The chancellors of the constituent institutions are responsible to the President as the chief administrative and executive officer of The University of North Carolina.

The General Assembly of North Carolina voted to elevate the College to the status of a Regional University effective July 1, 1967.

On October 30, 1971, the General Assembly ratified an Act to consolidate the Institutions of Higher Learning in North Carolina. Under the provisions of this Act, North Carolina Agricultural and Technical State University became a constituent institution of The University of North Carolina effective July 1, 1972.

Six presidents have served the institution since it was founded in 1891. They are as follows: Dr. J. O. Crosby, (1892-1896), Dr. James B. Dudley, (1896-1925), Dr. F. D. Bluford, (1925-1955), Dr. Warmoth T. Gibbs, (1956-1960), Dr. Samuel DeWitt Proctor, (1960-1964), and Dr. Lewis C. Dowdy, who was elected President April 10, 1964.

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

HISTORICAL STATEMENT

North Carolina Agricultural and Technical State University was established as the "A. and M. College for the Colored Race" by an act of the General Assembly of North Carolina ratified March 9, 1891. The act read in part:

That the leading object of the institution shall be to teach practical agriculture and the mechanic arts and such branches of learning as relate thereto, not excluding academical and classical instruction.

The College began operation during the school year of 1890-91, before the passage of the state law creating it. This curious circumstance arose out of the fact that the Morrill Act passed by Congress in 1890 earmarked the proportionate funds to be allocated in bi-racial school systems to the two races. The A. and M. College for the White Race was established by the State Legislature in 1889 and was ready to receive its share of funds provided by the Morrill Act in the Fall of 1890. Before the college could receive these funds, however, it was necessary to make provisions for Colored students. Accordingly, the Board of Trustees of the A. and M. College in Raleigh was empowered to make temporary arrangements for these students. A plan was worked out with Shaw University in Raleigh where the College operated as an annex to Shaw University during the years 1890-1891, 1891-1892, and 1892-1893.

The law of 1891 also provided that the College would be located in such city or town in the State as would make to the Board of Trustees a suitable proposition that would serve as an inducement for said location. A group of interested citizens in the city of Greensboro donated fourteen acres of land for a site and \$11,000 to aid in constructing buildings. This amount was supplemented by an appropriations of \$2,500 from the General Assembly. The first building was completed in 1893 and the College opened in Greensboro during the fall of that year.

In 1915 the name of the institution was changed to The Agricultural and Technical College of North Carolina by an Act of the State Legislature.

The scope of the college program has been enlarged to take care of new demands. The General Assembly authorized the institution to grant the Master of Science degree in education and certain other fields in 1939. The first Master's degree was awarded in 1941. The School of Nursing was established by an Act of the State Legislature in 1953 and the first class was graduated in 1957.

The General Assembly repealed previous acts describing the purpose of the College in 1957, and redefined its purpose as follows:

"The primary purpose of the College shall be to teach the Agricultural and Technical Arts and Sciences and such branches of learning as related thereto; the training of teachers, supervisors, and administrators for the public schools of the State, including the preparation of such teachers, supervisors and administrators for the Master's degree. Such other programs of a professional or occupational nature may be offered as shall be approved by the North Carolina Board of Higher Education, consistent with the appropriations made therefor."

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

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| Lacy H. Caple | Lexington |
| Betty Cone | Greensboro |
| Wilbert Greenfield | Charlotte |
| C. C. Griffin | Concord |
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1978-1979

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B.S., Hampton Institute; M.Ed., D.Ed., Pennsylvania State University
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B.S., A. and T. College; M.S., Ph.D., University of Iowa
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B.A., University of Arkansas at Pine Bluff; M.A., Ed.D., University of Arkansas at Fayetteville
- Wyatt D. Kirk, *Associate Professor of Educational Psychology and Guidance*
B.S., M.S., Ed.D., Western Michigan University
- David E. Klett, *Associate Professor of Mechanical Engineering*
B.S., Michigan State University; M.S., Ph.D., University of Florida
- Valena H. Lee, *Assistant Professor of Educational Media and Technology*
B.A., St. Augustine's College; M.S., M.L.S., Indiana University
- Robert T. Levine, *Associate Professor of English*
B.A., Queens College; M.A., Ph.D., Cornell University
- Frances Logan, *Professor of Sociology and Social Service*
B.S., Ed.M., Temple University; M.S.W., D.S.W., University of Pennsylvania
- Eugene Marrow, *Professor of Biology*
B.S., A. and T. College; M.S., Ph.D., The Catholic University of America
- Jesse E. Marshall, *Professor of Guidance*
B.S., Agricultural, Mechanical and Normal College; M.S., Ed.D., Indiana University
- Dorothy Mason, *Professor of History*
A.B., The University of North Carolina at Greensboro; M.A., University of Georgia; Ph.D., The University of North Carolina at Chapel Hill
- Aurelia C. Mazyck, *Assistant Professor of Educational Psychology and Guidance*
B.S., Howard University; M.S., N. Y. University; Ph.D., The University of North Carolina at Greensboro
- Harold Mazyck, *Professor of Child Development and Counselor Education*
B.S., South Carolina State College; M.A., New York University; Ph.D., The University of North Carolina at Greensboro
- Joseph W. McPherson, *Assistant Professor of Mechanical Engineering*
B.S., Guilford College; M.S., Ph.D., Florida State University
- Peter V. Meyers, *Assistant Professor of History*
B.A., Wesleyan University; M.A., Rutgers, The State University
- Roy D. Moore, *Professor of Health, Physical Education and Recreation*
B.S., North Carolina College; M.S., Ph.D., University of Illinois
- Lawrence B. Morse, *Associate Professor of Economics*
B.A., Oberlin College; Ph.D., University of Minnesota
- James G. Nutsch, *Associate Professor of History*
B.S., Kansas State University; M.A., Ph.D., University of Kansas
- David E. Olson, *Associate Professor of Electrical Engineering*
B.S., Michigan Technical University; Ph.D., University of Utah
- Howard Pearsall, *Professor of Music*
B.S., Fisk University; M.A., Western Reserve University; Ed.D., Indiana University
- Charles W. Pinckney, *Professor of Industrial Education*
B.S., South Carolina State College; M.S., University of Illinois; D.Ed., Pennsylvania State University

- Robert B. Pyle, *Associate Professor of Industrial Technology*
B.A., M.S., Trenton State College; Ph.D., University of Pittsburgh
- Jothi Ramasamy, *Assistant Professor of Chemistry*
B.Sc., Annamalai University, Cdm., India; Ph.D., Kansas State University
- Glenn F. Rankin, *Professor of Education*
B.S., A. and T. College; M.S., Ed.D., Pennsylvania State University
- Richard D. Robbins, *Associate Professor of Economics*
B.S., A. and T. College; M.S., Ph.D., North Carolina State University at Raleigh
- Howard F. Robinson, *Professor of Agricultural Economics*
B.S., A. and T. College; M.S., University of Illinois; Ph.D., Ohio State University
- Randa Russell, *Professor of Physical Education*
A.B., Kentucky State College; M.S., A. and T. College; A.M., University of Michigan; M.P.H., University of Minnesota; Ed.D., University of Michigan
- Myrtle Sampson, *Assistant Professor of Educational Psychology and Guidance*
B.S., M.L.S., North Carolina Central University; M.S., North Carolina A. and T. State University; Ed.D., University of North Carolina at Greensboro
- Donald Schaefer, *Associate Professor of Economics*
A.B., Franklin and Marshall College; Ph.D., University of North Carolina at Chapel Hill
- Chung-Woon Seo, *Associate professor of Food and Nutrition*
B.S., M.S., Korea University; Ph.D., The Florida State University
- Karen J. Sepsi, *Assistant Professor of Elementary Education and Reading*
B.S., M.S., California State College; Ed.D., University of Cincinnati
- Avva Sharma, *Professor of Mechanical Engineering*
B.Sc., Saugor University; D.M.I.T., Madras Institute of Technology; M.S., Oklahoma State University; Ph.D., Pennsylvania State University
- Sarla Sharma, *Professor of Psychology and Guidance*
B.A., Banaras Hindu University; M.A., The University of Chicago; Ph.D., The University of North Carolina at Greensboro
- S. J. Shaw, *Professor of Education*
B.S., Fayetteville State College; M.A., North Carolina College; Ph.D., The University of North Carolina at Chapel Hill
- Ernest Sherrod, *Assistant Professor of Electrical Engineering*
B.S., M.S., A. and T. College
- Amarjit Singh, *Associate Professor of Political Science*
B.A., Punjab University; LL.B., Delhi University; M.E.S., Ph.D., Claremont Graduate School
- Myrtle Smith, *Professor of Clothing and Textiles*
B.S., North Carolina College; M.S., Ph.D., Ohio State University
- Wilbur L. Smith, *Professor of Mathematics*
B.S., A. and T. College; M.A., Ph.D., The Pennsylvania State University
- Albert W. Spruill, *Professor of Education*
B.S., A. and T. College; M.S., Iowa State University; Ed.D., Cornell University
- Elias K. Stefanakos, *Associate Professor of Electrical Engineering*
B.S., M.S., Ph.D., Washington State University

- Arthur Stevens, *Associate Professor of Chemistry*
B.S., Langston University; M.S., Oklahoma University
- William A. Streat, *Professor of Architectural Engineering*
B.S., Hampton Institute; B.S., University of Illinois; S.M., Massachusetts Institute of Technology
- Virgil Stroud, *Professor of Political Science*
B.S., A. and T. College; M.A., Ph.D., New York University
- Jan A. Stulinsky, *Professor of Architectural Engineering*
M.A., Polytechnic University; M.A., University of Capernicus; Doctor of Technical Science, Polytechnic University
- Ethel F. Taylor, *Associate Professor of English*
A.B., Spelman College; M.A., Atlanta University; Ph.D., Indiana University
- Avinash Tilak, *Assistant Professor of Industrial Engineering*
B.T.M.E., Indian Institute of Technology; M.S., Ph.D., Texas Technical University
- Richard Tucker, *Professor of Mathematics*
B.S., University of Washington; M.S., Ph.D., Oregon State University
- Alphonso Vick, *Professor of Botany*
A.B., Johnson C. Smith University; M.S., North Carolina State at Durham; A.M., University of Michigan; Ph.D., Syracuse University
- Marian Vick, *Professor of Education*
B.S., Fayetteville State College; M.S., University of Michigan; C.A.G.S., Syracuse University; Ed.D., Duke University
- Alfreda Webb, *Professor of Biology*
B.S., Tuskegee Institute; M.S., Michigan State University; D.V.M., Tuskegee Institute
- Burleigh C. Webb, *Professor of Plant Science*
B.S., A. and T. College; M.S., University of Illinois; Ph.D., Michigan State University
- Ta-Hsien Wei, *Assistant Professor of Electrical Engineering*
B.S., National Taiwan University; M.S., University of Michigan; Ph.D., Columbia University
- Sullivan Welborne, *Assistant Professor of Administration and Post-secondary Education*
B.S., M.S., North Carolina A. and T. State University; Ed.D., The University of North Carolina at Greensboro
- Frank White, *Professor of History*
B.S., Hampton Institute; M.S., Ph.D., New York University
- Joseph White, *Professor of Biology*
B.S., M.S., North Carolina College; Ph.D., University of Illinois
- James A. Williams, Jr., *Professor of Biology*
A.B., Talladega College; M.S., Atlanta University; Ph.D., Brown University
- Jimmy L. Williams, *Professor of English*
B.A., Clark College; M.A., Washington University; Ph.D., Indiana University
- Leo Williams, Jr., *Professor of Electrical Engineering*
B.S., M.S., University of Illinois

- Bernice Willis, *Assistant Professor of Elementary Education and Reading*
B.A., M.A., Oberlin College; Ed.D., Duke University
- Ralph L. Wooden, *Professor of Education*
B.S., A. and T. College, M.A., Ph.D., Ohio State University
- Walter Wright, *Professor of Chemistry*
B.S., M.S., North Carolina College; Ph.D., New York University
- Lee A. Yates, *Assistant Professor of Plant Science*
B.S., M.S., North Carolina A. and T. State University
- Chung Yu, *Associate Professor of Electrical Engineering*
B.Eng., McGill University; M.S., Ph.D., Ohio State University
- Victor Zaloom, *Professor of Industrial Engineering*
B.S.I.E., M.S.E., University of Florida; Ph.D., University of Houston

LOCATION

North Carolina Agricultural and Technical State University is located in the City of Greensboro, North Carolina. This urban location puts major shopping centers, churches, theaters, medical facilities and transportation within convenient distance for the students. This location offers an advantage to many students who desire part-time employment while attending the University.

The City of Greensboro offers a variety of cultural activities and recreational facilities. It has become known for its colleges and universities, art galleries, libraries and museum.

The Memorial Auditorium attracts outstanding athletic events, concerts, and other popular events. The City offers facilities for bowling, boating, fishing, horseback riding, tennis and golf.

THE PHYSICAL PLANT

The university campus comprises modern, fire resistant buildings, all thoroughly maintained for the highest level of efficiency, located on land holdings in excess of 181 acres.

UNIVERSITY BUILDINGS

Dudley Memorial Building (Administration)
F. D. Bluford Library
Harrison Auditorium
Charles Moore Gymnasium
Coltrane Hall (Headquarters for N. C. Agricultural Extension Service)
Memorial Union
The Oaks (President's Residence)
Health, Physical Education and Recreation Building

CLASS ROOM AND LABORATORY BUILDINGS

| | |
|------------------------|---|
| Carver Hall | School of Agriculture |
| Cherry Hall | School of Engineering |
| Crosby Hall | School of Arts and Sciences |
| Hodgin Hall | School of Education |
| Noble Hall | School of Nursing |
| Price Hall | Division of Industrial Education and Technology |
| Benbow Hall | Home Economics |
| Garret House | Home Economics |
| Hines Hall | Chemistry |
| Sockwell Hall | Agricultural Technology |
| Ward Hall | Dairy Manufacturing |
| Reid Greenhouses | |
| Graham Hall | School of Engineering and Computer Science Center |
| Frazier Hall | Music-Art |
| Price Hall | Division of Industrial Education & Technology |
| Price Hall Annex | Child Development Laboratory |
| Campbell Hall | ROTC Headquarters |
| Barnes Hall | Biology |
| Merrick Hall | School of Business and Economics |

RESIDENCE HALLS

| | |
|-------------------|---------------------|
| Curtis Hall (148) | Morrison Hall (94) |
| Gibbs Hall (200) | Vanstory Hall (200) |

High Rise Dormitory (East) (194)
 High Rise Dormitory (West) (208)
 Holland Hall (144)

Cooper Hall (400)
 Scott Hall (1010)
 Senior Hall (200)

SERVICE BUILDINGS

Murphy Hall Student Services
 Brown Hall Cafeteria, Post Office, Student Financial Aid Office
 Sebastian Infirmary
 T. E. Neal Heating Plant
 Laundry-Dry Cleaning Plant
 Williams Hall Cafeteria
 Clyde Dehuguley Physical Plant Building

OTHER FACILITIES

University Farms—including 600 acres of land and modern farm buildings
 Athletic field—including three practice fields for football, quarter mile track, baseball diamond and field house

DEGREE PROGRAMS

Students who complete one or more of the courses of study listed below will be awarded the degree indicated.

GRADUATE DEGREES

| | |
|---|---|
| Adult Education—M.S. | English and Afro American Literature—M.A. |
| Agricultural Economics—M.S. | English, Secondary Education—M.S. |
| Afro-American Literature—M.A. | Food and Nutrition—M.S. |
| Agricultural Education—M.S. | French, Education—M.S. |
| Art Education, Secondary—M.S. | Health and Physical Education—M.S. |
| Educational Media—M.S. | History, Secondary Education—M.S. |
| Biology—M.S. | Industrial Arts Education—M.S. |
| Biology, Secondary Education—M.S. | Industrial Engineering—M.S. |
| Chemistry—M.S. | Intermediate Education (4-7)—M.S. |
| Chemistry, Secondary Education—M.S. | Mathematics, Secondary Education—M.S. |
| Driver and Safety Education—M.S. | Physical Education—M.S. |
| Education—M.S. | Reading Education—M.S. |
| Educational Administration and Supervision—M.S. | Social Science, Secondary Education—M.S. |
| Elementary Education, Early Childhood—M.S. | Student Personnel (Counseling Education; Guidance)—M.S. |
| Elementary Education, General—M.S. | Vocational-Industrial Education—M.S. |
| Electrical Engineering—M.S. | |
| Engineering—M.S. | |

HISTORY

Graduate education at North Carolina A. and T. State University was authorized by the North Carolina State Legislature in 1939. The authorization provided for training in agriculture, technology, applied science, and applied areas of study. An extension of the graduate program, approved by the General Assembly of North Carolina in 1957, provided for enlargement of the curriculum to include teacher education, as well as such other programs of a professional or occupational nature as might be approved by the North Carolina State Board of Higher Education.

On July 1, 1967, the legislature of North Carolina approved regional university status for the institution and renamed it North Carolina Agricultural and Technical State University. The graduate responsibilities of the institution as a regional university are to prepare teachers, supervisors, and administrators for the master's degree, to offer master's degree programs in the liberal arts and sciences, and to conduct such other programs as are deemed necessary to meet the needs of its constituency and of the state.

The University awarded its first master's degree in 1941 to Woodland Ellroy Hall. Since that time, several thousand students have received this coveted degree of advanced studies. A significant number of these graduates have gone on to other universities to achieve the prestigious doctorate degree in their chosen specialties.

The Graduate School through its various disciplines is affiliated with The American Chemical Society, Engineer's Council on Professional Development, The National Council for the Accreditation of Teacher Education, The Council of Graduate Schools in The United States and other prestigious regional and national academic bodies.

PURPOSE

The Graduate School coordinates advanced course offerings of all departments within the School of Agriculture, the School of Education, the School of Arts and Sciences, and the School of Engineering. Thus, the Graduate School offers advanced study for qualified individuals who wish to improve their competence for careers in professions related to agriculture, humanities, education, social studies, science, and technology. Such study of information and techniques is provided through curricula leading to the Master of Science or Master of Arts degree and through institutes and workshops designed for those who are not candidates for a higher degree. Second, the Graduate School provides a foundation of knowledge and of techniques for those who wish to continue their education in doctoral programs at other institutions. Third, the Graduate School assumes the responsibility of encouraging scholarly research among students and faculty members.

It is expected that, while studying at this university, graduate students (1) will acquire special competence in at least one field of knowledge; (2) will develop further their ability to think independently and constructively; (3) will develop and demonstrate the ability to collect, organize, evaluate, and report facts which will enable them to make a scholarly contribution to knowledge about their discipline; and (4) will make new applications and adaptations of existing knowledge so as to contribute to their profession and to human-kind.

ORGANIZATION

Graduate School Council

The Graduate School Council is responsible for formulating all academic policies and regulations affecting graduate students, graduate courses, and graduate curricula. The council consists of the chairpersons of the departments offering concentrations in graduate studies, the deans of the schools offering graduate instruction, the Director of the Summer School, the Dean of Academic Affairs, the Director of Admissions, Registration and Records, and the Director of Teacher Education, five graduate students elected from the Graduate Club, and five faculty members selected from the graduate faculty. The Dean of the Graduate School serves as chairperson of the council.

ADVISORY COMMITTEES OF THE GRADUATE SCHOOL

Standing committees of the Graduate School are organized to advise the council on matters pertaining to present policies, to evaluate existing and proposed programs of

study, and to process student petitions relating to academic matters. These committees are:

- Committee on Admissions and Retention
- Committee on Curriculum
- Committee on Publications
- Committee on Rules and Policy

DEGREES GRANTED

The Graduate School of North Carolina A. and T. State University offers the following degrees:

MASTER OF ARTS

- English and Afro-American Literature

MASTER OF SCIENCE

1. Adult Education
2. Agricultural Economics
3. Biology
4. Chemistry
5. Electrical Engineering
6. Engineering
7. Food and Nutrition
8. Industrial Engineering
9. Specialized Teaching and Related Fields
 - A. Administration, Supervision and Post-Secondary Education
 - (1) Administration
 - (2) Supervision
 - B. Agricultural Education
 - C. Educational Media
 - D. Elementary Education and Reading
 - (1) Early Childhood Education
 - (2) Elementary Education
 - (3) Intermediate Education
 - (4) Reading
 - E. Guidance or Counseling Education
 - F. Industrial Education
 - (1) Industrial Arts Education
 - (2) Trade and Industrial Education
 - G. Safety and Driver Education
10. Specialized Secondary Education Teaching Fields with Majors in Subject Matter Departments
 - A. Art
 - B. Biology
 - C. Chemistry
 - D. English
 - E. History
 - F. Mathematics
 - G. Health and Physical Education
 - H. Social Science

Master of Science programs in Agricultural Education, Education and Industrial Education enable students to become eligible for the following certificates issued by the North Carolina State Department of Public Instruction:

1. Graduate Elementary Certificate
2. Graduate Secondary Certificate

3. Administrator I (Master's degree)
4. Curriculum Instructional Specialist
5. Local Directors of Vocational Education
6. Middle Grades Occupational Exploration
7. Industrial Cooperative Training

NONDISCRIMINATION POLICY

NORTH CAROLINA A&T STATE UNIVERSITY is dedicated to equality of opportunity within its community. Accordingly, NORTH CAROLINA A&T STATE UNIVERSITY does not practice or condone discrimination, in any form, against students, employees, or applicants on the grounds of race, color, national origin, religion, sex, age, or handicap. NORTH CAROLINA A&T STATE UNIVERSITY commits itself to positive action to secure equal opportunity regardless of those characteristics.

NORTH CAROLINA A&T STATE UNIVERSITY supports the protections available to members of its community under all applicable Federal laws, including Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 799A and 845 of the Public Health Service Act, the Equal Pay and Age Discrimination Acts, the Rehabilitation Act of 1973, and Executive Order 11246.

ADMISSION AND OTHER INFORMATION

ADMISSION TO GRADUATE STUDY

All applicants for graduate study must have earned a bachelor's degree from a four-year college. Application forms must be submitted to the Graduate School Office with two transcripts of previous undergraduate and graduate studies. Processing of applications cannot be guaranteed unless they are received, with all supporting documents, in the Graduate Office at least fifteen days before a registration period. Applicants may be admitted to graduate studies unconditionally, provisionally, or as special students. Applicants are admitted without discrimination because of race, color, creed, or sex.

Unconditional Admission

To qualify for unconditional admission to graduate studies, an applicant must have earned an over-all average of 2.6 on a 4 point system (or 1.6 on a 3 point system) in his/her undergraduate studies. In addition, a student seeking a degree in Agricultural Education, Elementary Education, Industrial Education, or Secondary Education must possess, or be qualified to possess, a Class A Teaching Certificate in the area in which he/she wishes to concentrate his/her graduate studies. A student seeking a degree with concentration in Administration or Guidance must possess, or be qualified to possess, a Class A Teaching Certificate.

Provisional Admission

An applicant may be admitted to graduate studies on a provisional basis if (1) he/she earned his/her baccalaureate degree from a non-accredited institution or (2) the record of his/her undergraduate preparation reveals deficiencies that can be removed near the beginning of his/her graduate study. A student admitted provisionally may be required to pass examinations to demonstrate his/her knowledge in specified areas, to take specified undergraduate courses to improve his/her background, or to demonstrate his/her competence for graduate work by earning no grades below "B" in his/her first nine hours of graduate work at this institution.

Special Students

Students not seeking a graduate degree at A. and T. may be admitted in order to take courses for self-improvement or for renewal of teaching certificate if said students meet standard Graduate School entrance requirements. If a student subsequently wishes to pursue a degree program, he/she must request an evaluation of his/her record. The Graduate School reserves the right to refuse to accept towards a degree program credits which the candidate earned while enrolled as a special student; in no circumstances may the student apply towards a degree program more than twelve semester hours earned as a special student.

HOUSING

The university maintains six residence halls for women and three for men. A request for dormitory housing accommodation should be directed to the Dean of Students at least sixty days prior to the expected date of registration.

FOOD SERVICES

The university provides food service for students at minimum cost. Two cafeterias and a snack bar are operated at convenient locations on the campus. Students who live in the residence halls are required to eat in the cafeterias.

RESIDENCE CLASSIFICATION FOR PURPOSES OF APPLICABLE TUITION DIFFERENTIALS

Residence classification for tuition purposes are set forth by law in North Carolina as follows:

G. S. 116-143.1 (b)

"To qualify for in-state tuition a legal resident must have maintained his domicile in North Carolina for at least the 12 months immediately prior to his classification as a resident for tuition purposes. In order to be eligible for such classification, the individual must establish that his or her presence in the State during such twelve-month period was for purposes of maintaining a bona fide domicile rather than for purposes of mere temporary resident incident to enrollment in an institution of higher education; further, (1) if the parents (or court-appointed legal guardian) of the individual seeking resident classification are (is) bona fide domiciliaries of this State, this fact shall be prima facie evidence of domiciliary status of the individual applicant and (2) if such parents or guardian are not bona fide domiciliaries of this State, this fact shall be prima facie evidence of non-domiciliary status of the individual.

University regulations concerning the classification of students by residence, for purposes of applicable tuition differentials, are set forth in detail in *A Manual To Assist The Public Higher Education Institutions of North Carolina in the Matter of Student Residence Classification for Tuition Purposes*. Each student is responsible for knowing the contents of that Manual, which is the controlling administrative statement of policy on this subject. Copies of the Manual are available on request in The Office of Admissions of A. and T. State University for purposes of student inspection.

FINANCIAL ASSISTANCE

Graduate Assistants

A limited number of graduate assistantships are available to qualified individuals. The student is assigned to assist a professor or a department twenty hours per week for the duration of the assistantship. Some graduate assistants are assigned to teach freshman classes. Normally, a graduate assistant will be assigned to teach only one class per semester, but he/she may be assigned to teach a maximum of two. The assistantship offers a stipend in addition to the funds required for tuition, fees, books, and board and lodging expenses for residence on campus. Application for an assistantship must be made to the Dean of the Graduate School at least five months before fall registration. Only full-time graduate students are eligible.

Other Assistance

Funds, such as the National Defense Student Loan Fund, are available in limited quantity for students. Requests for informing concerning these funds should be directed to the Graduate School.

EXPENSES

The fee charged to a full-time student carrying nine or more semester hours of work are the same as those charged to full-time undergraduate students. For one academic year, a state resident should expect to pay \$622.00 which will cover tuition and course fees; this sum does not include room and board charges. Tuition and course fees for an out-of-state student carrying a full schedule will total \$2,327.00 for the academic year. Current room and board rates are \$559.50 per semester.

For the Summer, each in-state student pays \$18.20 per credit hour for tuition and required fees; each out-of-state student pays \$38.50 per credit hour for tuition and required fees. Room and board are \$26.75 per week.

As student fees are subject to change without prior notice, it is suggested that the Cashier's Office be consulted for complete information concerning charges for full and part-time students.

Special Fees

| | |
|--|---------|
| Fee for processing application (required only for first application for graduate studies) | \$10.00 |
| Late Registration | 15.00 |
| Graduation fees: | |
| Diploma | 15.00 |
| Regalia | 15.00 |
| Transcript (after the first one) | 1.00 |
| Master's thesis binding fee | 20.00 |

Auditing

To audit a course, a student must obtain permission from the Dean of the Graduate School and must submit the necessary forms during the registration period. A part-time student must pay all fees, including tuition, that would be charged to a student taking the course for credit. A full-time student is not required to pay any additional fees for auditing. A change from "credit" registration to "audit" will not be permitted after the close of the deadline date for withdrawing from a course. An auditor is not required to participate in class discussions, prepare assignments, or take examinations.

SCHEDULE OF DEADLINES

The Graduate School provides schedules of specific dates for completing various requirements for a degree program. These notices are not sent to individuals automatically, but may be found in the calendar of the Graduate School, available upon request.

REQUEST FOR GRADE REPORTS AND TRANSCRIPTS

The Office of Registration and Records is the official record keeping office at the college. Requests for official statements regarding courses completed, grade reports, or transcripts should be directed to that office.

GENERAL REGULATIONS

ADVISING

Until he/she is assigned to an advisor after he/she has been accepted as a candidate in a degree program, a graduate student is advised by a member of the graduate faculty appointed by the Dean of the Graduate School. The student, however, should consult and follow the curriculum guide prepared for his/her area of concentration. Separate curriculum guide sheets are available in the office of the department offering the concentration. They may be secured also from the Graduate School Office.

"Special" students are advised by members of the graduate faculty appointed by the Dean of the Graduate School.

CLASS LOADS

Full-Time Students

Class loads for the full-time students may range from 9 to 15 semester hours during a regular session of the academic year. The maximum load is 15 semester hours.

In-Service Teachers

The maximum load for a fully employed in-service teacher must not exceed six semester hours during any academic year.

University Staff

The maximum load for any fully employed member of the university faculty or staff will be six semester hours for the academic year.

CONCURRENT REGISTRATION IN OTHER INSTITUTIONS

A student registered in a degree program in this Graduate School may not enroll concurrently in another graduate school except upon permission, *secured in advance*, from the Dean of the Graduate School.

GRADING SYSTEM

Grades for graduate students are recorded as follows: A, excellent; B, average; C, below average; F, failure; S, work in progress (for courses in research); I, INCOMPLETE; W, withdrawal.

1. In order to earn a degree, a student must have a cumulative average of "B," (a grade point average of 3.0 on a system in which 1 hour of A earns 4 grade points).
2. A graduate student automatically goes on probation when his/her cumulative average falls below "B."
3. A student may be dropped from the degree program if he/she has not been removed from probation after two successive terms as a full-time student.
4. A student may not repeat a required course in which "C" or above was earned.
5. A student may repeat a required course in which "F" was earned. A student may not repeat the course more than once. If a student fails a second time, he/she is dismissed from the degree program.
6. All hours attempted in graduate courses and all grade points earned are included in the computation of the cumulative average of a graduate student.
7. A student who stops attending a course but fails to withdraw officially may be assigned a grade of "F."
8. All grades of "I" must be removed during the student's next term of residence.
9. A student may not count towards a degree program any course in which a grade of "F" was earned.

Note: The North Carolina State Department of Public Instruction does not accept towards renewal of certification any course in which a student has received a grade of "D" or "F."

PROFESSIONAL EDUCATION REQUIREMENTS FOR CLASS A TEACHING CERTIFICATE

In all graduate degree programs except those leading to a Master of Science in Chemistry, in Biology, in Food and Nutrition, and the Master of Science in Engineering, the student at A. & T. State University must hold a Class A certificate before being admitted to candidacy.

To provide the professional education component for the student who enters graduate studies without the required credits in courses in education and who is pursuing a teaching program for the secondary school level, the following program of 24 semester hours is offered: Education 625, Education 400 (Psychological Foundations of Education), Guidance 600 and the Student Teaching Block: Education 500 (Principles and Curricula of Secondary Schools, the appropriate subject methods course, Education 637, and Education 560 (Observation and Student Teaching).

Students who have earned some but not enough undergraduate credits in education and students without "A" certificates who are seeking graduate degrees in early childhood education (Kindergarten-grade 3) should consult with the chairman of the Department of Education or the Dean of the Graduate School to work out programs to meet certification requirements.

While taking undergraduate courses in education and psychology to meet certification requirements, a student may enroll in graduate-level courses in his subject matter area of concentration if he has completed the undergraduate requirements in that area.

SUBJECT-MATTER REQUIREMENTS FOR CLASS A TEACHING CERTIFICATE

If a student has not completed sufficient undergraduate courses in a subject-matter field to hold a Class A certificate in that subject, he should consult with the chairman of the department offering that concentration. Together, they must work out a program to satisfy the undergraduate deficiencies by means of undergraduate courses or courses open to undergraduates and graduates.

REGULATIONS FOR A MASTER'S DEGREE

ADMISSION TO CANDIDACY FOR A DEGREE

Admission to graduate studies does not guarantee admission to candidacy for a degree. In order to be qualified as a candidate for a degree, a student must have a minimum overall average of 3.0 in at least nine semester hours of graduate work at A. and T., must have removed all deficiencies resulting from undergraduate preparation, and must have passed the Qualifying Essay. Some departments require additional qualifying examinations.

In order to be classified as a candidate for a Master of Science in Engineering degree, a student must have a minimum overall average of 3.0 in at least nine semester hours of approved graduate work at A. and T. and must have removed all deficiencies resulting from undergraduate preparation.

The following is the procedure for securing admission to candidacy:

1. The student secures application forms for admission to candidacy from the Graduate Office, fills them out, and returns them to that office. This step should be taken as soon as possible after the student has decided upon a degree program.

2. The Graduate Office processes the application, notifies the student of the action, and informs him/her of the time when the Qualifying Essay will next be administered.

3. The student may take the Qualifying Essay during the first term of residence in graduate studies. If a student fails the Qualifying Essay, he/she may take it a second time. After a second failure the student must enroll in a prescribed English composition course (English 300 or 621) at this university and must earn a grade of "C" or above.

4. The Graduate Office informs the student of any qualifying examinations required by the department in which he is concentrating his studies.

5. After the student has completed at least nine semester hours of graduate study at the college, he/she becomes eligible for admission to candidacy. If, at that time, he/she has maintained an average of 3.0 in graduate studies, has passed the Qualifying Essay and all departmental qualifying examinations, the Graduate School informs the student that he/she has been admitted to candidacy and assigns him/her to an adviser in his/her field of concentration.

In order to be eligible for graduation during a term, a student must have been admitted to candidacy no less than fifteen days prior to the deadline for filing for graduation during that term.

CREDIT REQUIREMENTS

The minimum credit requirements for a graduate degree are thirty semester hours for students in thesis and non-thesis programs. It is expected that a student can complete a program by studying full-time for an academic year and one additional summer term or by studying full-time during four nine-week summer sessions.

The minimum credit requirements for a Master of Science in Engineering are thirty semester hours for students who elect to take the thesis option and thirty-three semester hours for students who take the non-thesis option.

RESIDENCE REQUIREMENTS

A minimum of three-fourths of the hours required for the degree must be earned in residence study at the university.

TIME LIMITATION

The graduate program must be completed within six successive calendar years. Programs remaining incomplete after this time interval are subject to cancellation, revision, or special examination for out-dated work.

When the program of study is interrupted because the student has been drafted into the armed services, the time limit shall be extended for the length of time the student shall have been on active duty, if the candidate resumes graduate work no later than one year following his/her release from military service.

COURSE LEVELS

At the university, six-digit numbers are used to designate all course offerings. The last three digits indicate the classification level of the course. Courses numbered 600 through 699 are open to seniors and to graduate students. Courses numbered 700 through 799 are open only to graduate students. At least fifty percent of the courses counted in the work towards a Master's degree must be those open only to graduate students; that is, numbered 700 through 799.

TRANSFER OF CREDIT

A maximum of six semester hours of graduate credit may be transferred from

another graduate institution if (1) the work is acceptable as credit toward a comparable degree at the institution from which transfer is sought, and (2) the courses to be transferred are approved by the Dean of the Graduate School.

To request a transfer of credit, the student must complete an application in the Graduate School Office. It will be the applicant's responsibility to request from the appropriate institution(s) a statement certifying that the work is acceptable as credit toward a comparable degree. The transcript should then be sent to the Graduate School Office of A. and T. State University.

FINAL COMPREHENSIVE EXAMINATION

At least 45 days before a candidate expects to complete all work for the graduate degree, the candidate should file in the Graduate office an application for a final examination.

1. All graduate students are required to pass a written comprehensive examination in their area of specialty.

In the case of Engineering students, the School of Engineering will recommend to the graduate school whether or not this comprehensive examination will be oral or written.

2. Students pursuing a degree of M.S. in Education, subject-matter oriented, will take a comprehensive examination in two parts, subject-matter and professional education. The evaluation will be made by the faculties in the respective areas.
3. If a student fails a comprehensive examination twice, he/she must petition for a third examination. The petition is reviewed by a committee from the student's major concentration. A student who fails a third time is dismissed from the degree program.
4. Comprehensive examinations are to be scheduled by the departments, with the approval of the Graduate Office. A report of the student's performance must be submitted to the Graduate Office at least three weeks prior to Commencement.

OPTIONS FOR DEGREE PROGRAM

The student, in consultation with his/her adviser, selects the degree program to be followed. The adviser must notify the chairperson of the department of the program plan which the candidate prefers to follow.

Thesis Option

In order for a student to pursue a thesis program, he/she must be recommended to the Dean of the Graduate School by his/her adviser and the chairperson of the department in which a student is concentrating his/her studies. The Graduate School must then approve the student as a candidate. The thesis program consists of thirty semester hours including the thesis. After receiving written approval to follow the thesis option, the candidate shall prepare and present the thesis proposal to the adviser. Upon the request of the adviser, the Dean of the Graduate School shall appoint a Thesis Proposal Committee and shall fix a time of meeting. Following acceptance of the proposal, the adviser must submit to the Dean of the Graduate School an approved copy of the proposal in its final form. Individuals who have been granted the privilege of following the thesis option are expected to demonstrate research competencies and to prepare a scholarly account of resulting data.

Non-Thesis Option

The non-thesis plan is offered to the candidate who may benefit more from a broader range of studies than from the preparation of a thesis. The program of study must consist of a minimum of 30 credit hours of prescribed courses.

Individuals who are following this plan must demonstrate their ability to conduct and to report the results of original research by preparing a paper as a part of the course Special Problems or Research or Seminar in the appropriate area.

Thesis Option [Master of Science in Engineering]

In order for a student to pursue a thesis program, he/she must be recommended to the Dean of the Graduate School by the Dean of the School of Engineering. The Graduate School must then approve the student as a candidate. The thesis program consists of thirty semester hours including the thesis. After receiving written approval to follow the thesis option, the candidate shall prepare and present the thesis proposal to the chairperson of his/her Advisory Committee. Following acceptance of the proposal, an approved copy of the proposal in its final form must be submitted to the Dean of the Graduate School.

The Non-Thesis Option [Master of Science in Engineering]

The non-thesis plan is offered to the candidate who may benefit more from a broad-range of studies than from the preparation of a thesis. The program of study must consist of a minimum of 33 credit hours of prescribed courses.

MASTER'S THESIS AND FORMAT

The following regulations for a Master's thesis and the format of the thesis:

1. A student writing a thesis must register for the course, Thesis, prior to the semester in which he/she expects to take the final examination.
2. Three typewritten copies of the completed thesis must be submitted to the Dean of the Graduate School, together with two copies of an abstract of the thesis. The abstract should be 400 to 500 words. Consult the Graduate School's calendar for deadline dates regarding submission of these manuscripts.
3. Additional information concerning the format is available in the Graduate School Office.

APPLICATION FOR GRADUATION

A candidate for graduation must file an application for graduation at least 30 days prior to the close of the session in which he/she expects to complete the requirements for the degree. A student secures the application forms from his/her advisor, who must approve the application before it is sent to the Graduate School Office. Failure to meet the deadline may result in delay of graduation for the candidate.

GRADUATE RECORD EXAMINATION

The Graduate Record Examination is required of all students who desire to become candidates for the Master of Science degree. Information concerning the time, place, and cost of the examination may be obtained from the office of the Dean of the Graduate School.

SECOND MASTER'S DEGREE

The Graduate School of North Carolina A. and T. State University provides an opportunity for a student holding a Master's degree to earn a second Master's degree in another discipline or specialty. To be admitted for a second Master's degree, the student files the appropriate admission application, submits transcripts and provides pertinent examination scores.

During the first semester, the student makes application for candidacy. In the last semester of courses, the student files for the comprehensive examination in the new

specialty. In collaboration with the advisor, the student plans the new program to include a minimum of 18 semester hours in the new specialty to be taken in the University. Twelve hours will be accepted from the first Master's providing that degree was completed at North Carolina A. and T. State University. If the student is a transfer student, twenty four hours must be completed in the new program since University regulations allow only six semester hours to be accepted in transfer credits.

ADMINISTRATIVE POLICY CONCERNING CHANGES IN REQUIREMENTS FOR STUDENTS ENROLLED IN DEGREE PROGRAMS

Generally, a student is permitted to graduate according to the requirements specified either in the catalogue current during the year of his/her first application for candidacy or in the catalogue current during the year of his/her application for graduation. If more than six years pass between the student's application for candidacy and his application for graduation, the university reserves the right to require the student to satisfy the regulations in effect at the time of his/her application for graduation. In all instances, the Graduate School reserves the right to require students in programs in Agricultural Education, Education, or Industrial Education to satisfy the requirements specified by the North Carolina Department of Public Instruction at the time of the Student's completion of the requirements for the Master of Science degree.

COMMENCEMENT

Diplomas are awarded only at the commencement exercises following the completion of all requirements for the degree. Attendance at Commencement is required of all graduating students unless individually excused by the Dean of the Graduate School.

ADDITIONAL REGULATIONS

Additional rules, regulations, and standards for each of the areas of graduate study appear in the appropriate sections of the catalogue. The prospective student should read such sections with care.

Archives
F. T. Moore Library
N. C. A & T State University
Greensboro, N. C. 27411

DEGREE PROGRAMS

A curriculum guide for each degree program can be obtained from the Graduate School Office. With approval of the Dean of the Graduate School, the chairperson of a department in which a student is concentrating may permit a student to substitute a course for one listed as required.

MASTER OF SCIENCE IN ADULT EDUCATION

Focus

The general aim of the Master of Science in Adult Education program is to prepare present and prospective teachers of adult learners so that they will be capable of performing this role assignment. Emphasis is placed on the development of those competencies which are necessary for teaching the adult more effectively.

Objectives

Upon completion of the program, graduates will be expected to demonstrate these skills or competencies:

1. A broad understanding of and familiarity with the general field of adult education, i.e., concepts, theories, and teaching methods.
2. Ability to construct a curriculum involving the learners and relevant resources.
3. Ability to conduct (teach) a meaningful teaching-learning experience.
4. An understanding of an ability to evaluate a teaching-learning experience.
5. A perception which indicates a holistic and interdisciplinary view regarding adult/continuing education.
6. Capability to make a thorough assessment of the needs of adults.
7. The ability to define and formulate behavioral learning objectives.

Curriculum

The curriculum for the program includes offerings at the master's degree level in liberal studies, general education and adult education topics. A common core of courses will be required of all students. The minimum credit requirements are thirty (30) semester hours for students taking the thesis option and thirty-three (33) semester hours for students taking the non-thesis option. Each graduate student will be required to complete a practicum in adult teaching for a minimum of two months for the purpose of testing his/her teaching competencies.

Admission Requirements

All applicants must meet those entrance requirements as set forth by the Graduate School. Applicants may be admitted to the program unconditionally or provisionally as stated below:

1. Unconditional Admission—The applicant must have earned a bachelor's degree from a four-year college. The applicant's over-all average must be at least 2.6 on a 4-point system, as earned through undergraduate studies.
2. Provisional Admission—An applicant may be admitted provisionally under the following circumstances:
 - (a) Having earned a baccalaureate degree from a non-accredited institution, or
 - (b) Undergraduate preparation reveals deficiencies which can be removed near the beginning of the graduate study, or
 - (c) Interest in taking courses for either self-improvement or teaching certificate renewal and not interested in seeking a graduate degree at NCA&TSU. If the

student subsequently desires to pursue the degree program, no more than twelve semester hours may be applied.

Degree Requirements

Total Hours Required: A minimum of 30 hours with thesis or 33 hours without thesis and at least a 3.0 average on a 4.0 scale. At least 50% of the courses counted toward the graduate degree must be of courses offered to graduate students only, i.e., courses numbered 700-799.

| Courses | Description | Credits |
|------------------|---|----------------|
| A.E. 651 | Introduction to Adult Education | 3 |
| A.E. 652 | Methods in Adult Education | 3 |
| A.E. 653 | Adult Development & Learning | 3 |
| A.E. 700 | History & Philosophy of Adult/Cont. Education | 3 |
| A.E. 701 | Organization, Administration and Supervision of Adult Education Programs | 3 |
| A.E. 702 | Practicum in Teaching Adults | 3 |
| A.E. 705 | Thesis Research (Optional) | 3 |
| EDU. 710 | Methods and Techniques of Research | 3 |
| EDU. 790 | Seminar in Educational Problems | 3 |
| Ag. Ed. 601 | Adult Education in Occupational Education | 3 |
| EDU. 641 | Teaching the Culturally Disadvantaged Learner | 3 |
| EDU. 602 (Media) | Utilization of Educational Media | 3 |
| A.E. 654 | Gerontology | 3 |
| SSS. 669 | Small Groups | 3 |
| A.E. 703 | Seminar on Contemporary Issues in Adult/Cont. Edu. | 1 |
| A.E. 704 | Independent Study | 2 |
| EDU. 690 | The Community College & Post Secondary Education | 3 |
| A.E. 650 | Special Problems in Adult Education | 1-4 |

Other Requirements

- a. Qualifying Essay Examination
- b. 3.0 overall grade point average for all graduate courses
- c. Master's Comprehensive Examination in Adult Education

MASTER OF SCIENCE IN AGRICULTURAL EDUCATION

The Department of Agricultural Education offers programs leading to the Master of Science Degree. The programs are designed to meet the needs of individual students and emphasize the professional improvement of teachers and professional workers in related areas. They provide advanced preparation for employment in administration, supervision, teacher education, and research in agricultural education and related fields.

Requirements for Admission to a Degree Program

1. Baccalaureate degree from accredited undergraduate institution.
2. Class "A" teacher's certificate in Agricultural Education (or qualifications for such a certificate).
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.
4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

General Requirements for a Degree

A minimum of 30 semester hours are required. The degree is not conferred for a mere collection of credits. A well-balanced, unified, and complete program of study will be required. A student may meet the degree requirements by either full-time or part-time enrollment and by attendance in any combination of terms.

The student may follow a thesis or non-thesis program. Those candidates who do not write a thesis must present a suitable essay or investigative paper. Its nature and extent shall be determined by the department.

Courses in the major and minor areas will be selected on the basis of the individual's needs and interests. To qualify for the graduate certificate to teach in the public schools of North Carolina the candidate should complete 18 semester credits in subject matter agriculture. The candidate may concentrate in one subject matter area.

Other Requirements

(a) Graduate Record Examination (Aptitude Test and Advanced Test in Education), (b) 3.0 grade point average for all graduate courses, (c) Final Comprehensive Examination in Agricultural Education.

MASTER OF SCIENCE IN BIOLOGY

The Department of Biology offers two options for a Master of Science degree. One involves pure or professional biology as described below. The second option is biology-education which requires teaching credentials. This program is described later in this catalog.

I. *Description of the Program*

- A. Master of Science Degree in Biology to be Awarded: M.S.
- B. The Program is designed primarily for qualified students who are desirous of working toward advanced degrees in Biology, and who aspire to careers of creative scholarships in science, the training pertinent to graduate studies, successful research in biological investigations, and other vocations in health related areas.
- C. This program is directly related to the professional sequence of the undergraduate, B.S. degree in Biology. Students who complete the professional tract of the Bachelor's of Science degree in Biology fulfill the requirements for entrance into this program. It is the second step in the logical progression of students who are preparing themselves for professions and/or vocations in the area of Biology, and the diverse health related occupations.
- D. The program provides the basic advanced training in Biology that is essential to graduate studies leading the the Master of Science degree in Biology. The objectives of the program are:
 - a. The development of quality students who aspire to careers of creative scholarship in science
 - b. The preparation of students for further graduate studies
 - c. The development of students for successful research in biological investigations
 - d. The preparation of students for vocations in health related areas.

II. *Program Requirements and Curriculum*

A. Admission

1. The admission requirements in general will be those that are presently the admission policies for graduate study at this University. Specifically all applicants for graduate study must have earned a Bachelor's Degree from a four year college. Application forms may be obtained from the Office of the Graduate School and must be returned to that office with two

transcripts of previous undergraduate and graduate studies. Processing of applications cannot be guaranteed unless they are received, with all supporting documents, in the Graduate Office at least fifteen days before a registration period. Applicants may be admitted to graduate studies unconditionally, provisionally, or as special graduate students.

- a. **Unconditional Admission.** To qualify for unconditional admission to the Master of Science degree in Biology, an applicant must have earned an overall average of 2.6 on a 4 point system or 1.6 on a 3 point system in his undergraduate studies. His record must show the completion, with an average of "B" (3.0) or better, of an undergraduate major of at least 32 semester hours in the area of Biology and credit for four semesters of Chemistry and two semesters of Physics. To be admitted to the Master of Science degree in Biology, an applicant must have the preparation and ability which, in the judgment of the Department and the Graduate School, are sufficient to enable him to progress satisfactorily in this degree program.
- b. **Provisional Admission.** In exceptional cases in which the requirements for unconditional admission are not met, or if the undergraduate preparation is inadequate, an applicant, if considered to have a reasonable probability of making satisfactory progress in graduate Biology, may be admitted provisionally. For provisional admission, an applicant may be admitted to graduate study in Biology on a provisional basis if: (1) he earned the Baccalaureate degree from a non-accredited institution or (2) the record of his undergraduate preparation reveals deficiencies that can be removed near the beginning of his graduate studies. A student admitted provisionally may be required to pass an examination to demonstrate his knowledge in Biology, to take special undergraduate courses to improve his background, or to demonstrate his competence for graduate studies in Biology by earning no grades below "B" in his first nine hours of graduate studies at this Institution.
- c. **Special Graduate Students.** Applicants not seeking a graduate degree may be admitted to pursue courses in this program for self-improvement such as becoming more knowledgeable of biological information relative to career occupations in biological and/or health related professions.

B. Degree Requirement

1. There will be a requirement of thirty semester hours for the completion of the Master of Science degree in Biology.
2. Approximately one half of the courses offered in this program will be designated as courses open only to graduate students.
3. A student must have a cumulative average of "B" (a grade point average of 3.0 on a system in which one hour of "A" earns 4 grade points).
4. A maximum of six semester hours of graduate credit may be transferred from another graduate institution if: (1) the work is acceptable as credit toward a comparable degree at the institution from which transfer is sought, and (2) the courses to be transferred are approved by the Dean of the Graduate School.
5. The minimum residence requirement is one academic year or 36 weeks of attendance. A student who does not complete his degree within six successive calendar years may lose credit for hours earned more than six years prior to his application for graduation.

A reading knowledge of one foreign language will be required for the Master of Science degree in Biology. This requirement must be satisfied

prior to admission to candidacy for the degree. The examination of the student for his foreign language requirement will be administered by the pertinent language department.

6. Students who are candidates for the Master's degree will be required to pass two comprehensive examinations. One of these is a "comprehensive writing examination" covering the courses within the biological sphere of this program. The other comprehensive examination will be the "oral examination" covering the thesis. A committee consisting of examiners representing the major and minor areas of the candidates' subject matter concentration will administer this examination.
7. This program must be completed within six successive calendar years. When, however, the program is interrupted by the student's being drafted into the armed services, the time limit shall be extended for the length of time the student shall have been on active duty, if the candidate resumes graduate work no later than one year following his/her release from military service.

MASTER OF SCIENCE DEGREE IN CHEMISTRY

The Department of Chemistry offers the Master of Science degree in Chemistry. In addition to this program, the department provides instruction for those graduate students who wish to pursue a curriculum that can lead to a degree in Education with specialization in Chemistry. Individuals who desire to renew teaching certificates in the field may also enroll in certain courses in the department for this purpose.

Requirements for Admission to a Degree Program

1. Baccalaureate degree from an accredited undergraduate institution.
2. Undergraduate major in Chemistry including one year of undergraduate Physical Chemistry and one year of Integral and Differential Calculus.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.
4. Any student, who is a rising junior in Chemistry, with a grade-point average of 3.0 in Chemistry and an overall grade-point average of 2.7.
Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

General Requirements for a Degree, 30 Semester Hours, Including Thesis

1. Required Courses

Chemistry 611—Advanced Inorganic Chemistry
Chemistry 722—Advanced Organic Chemistry
Chemistry 743—Chemical Thermodynamics
Chemistry 701—Seminar
Chemistry 732—Advanced Analytical Chemistry
Chemistry 799—Thesis Research
Chemistry 702—Chemical Research

(A maximum of 9 hrs. may be earned in 702)

2. Other Requirements

- a. 2-9 s.h. in electives
- b. GRE (Aptitude Test and Advanced Test in Chemistry). Scores must be submitted to the Graduate School Office before admission to the final examination can be granted.
- c. Satisfactory completion of an examination in German.
- d. Satisfactory presentation and defense of a thesis.
- e. One academic year of residence at A. and T.

- f. 3.0 grade point average for all graduate courses.
- g. Final comprehensive examination in Chemistry.
- h. Participation in seminar while in residence.

Candidates for the Master of Science in Chemistry who desire to teach in the public schools of North Carolina on a graduate certificate should study the course and examination requirements described for candidates for an M.S. in Education with concentration in Chemistry.

MASTER OF SCIENCE DEGREE IN EDUCATION

The School of Education offers the Master of Science in Education. This program is designed for the individual who wishes to seek a graduate certificate to teach or to serve in an administrative capacity in the public schools of North Carolina.

Areas of concentration included in this degree program are: 1) Educational media, 2) Elementary Education, 3) Administration, 4) Guidance, 5) Secondary Education, 6) Supervision, 7) Reading, 8) Safety and Driver Education.

Requirements for Admission to a Degree Program

1. Baccalaureate degree from accredited undergraduate institution.
2. Class A certificate in area of concentration.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.

Educational Media—30 s.h. required

- A. Non-Thesis Option: 30 semester hours required
 1. 3 s.h. in Curriculum and 3 s.h. in Historical and Philosophical Foundations of Education.
 2. Education 642, 644— 6 s.h.
 3. 12 s.h. from the following in consultation with adviser: Education 611, 612, 624, 645, 650, 651, 734, 735, 736, 738.
- B. Thesis Option: 30 s.h. required
 1. 3 s.h. in Curriculum and 3 s.h. in Historical Foundations of Education.
 2. Education 642, 644—6 s.h.
 3. 12 s.h. from the following in consultation with adviser: Education 611, 612, 624, 645, 650, 651, 734, 735, 736, 738.
- C. Other Requirements
 1. Master's Comprehensive in Education
 2. Master's Comprehensive in Educational Media

DEPARTMENT OF ADMINISTRATION, SUPERVISION, AND POSTSECONDARY EDUCATION

S. Joseph Shaw, Acting Chairperson

Objectives

The objectives of the Department of Administration, Supervision, and Postsecondary Education are to offer graduate level programs of preparation in educational administration and supervision and postsecondary education. The masters degree programs in administration and supervision are consistent with State-adopted competency-based guidelines and lead to North Carolina certification at the Administrator I and Curriculum-Instructional Specialist I levels. The Department also offers programs of certification for those students who already hold a masters degree in Education with certification in other professional areas. The graduate program is designed to prepare students for positions in administration, supervision, and teaching primarily at the community college and technical institute levels.

Degrees Offered

Master of Science in Education—Administration

Master of Science in Education—Supervision

General Program Requirements

Requirements for admission to degree programs in the School of Education are as follows:

1. Baccalaureate degree from accredited undergraduate institution.
2. Class A certificate in area of concentration.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.

Under policies of the Graduate School, candidacy for a degree requires the following:

1. The Qualifying Essay.
2. The Graduate Record Examination (Aptitude and Advanced Test in Education)
3. The Masters Comprehensive in Education and in either Administration or Supervision.
4. An overall grade point average of 3.0 for all graduate level courses.

Departmental Requirements

The major in Administration must complete 30 semester hours of University courses for a graduate degree and at least 12 semester hours for certification only. An overall grade point average of 3.0 must be maintained for the degree or for certification.

A Curriculum Instructional Specialist major must complete from 30-33 semester hours for a graduate degree (30 for those completing work for the supervisor's program at the Early Childhood level and the Intermediate Education Level). An overall grade point average of 3.0 must be maintained.

Accreditation

The graduate degree programs in administration and supervision are approved by the North Carolina State Department of Public Instruction.

Career Opportunities

Graduate degree and certification programs qualify the student for the principalship and/or supervisory positions at the elementary and secondary school levels. The program in postsecondary education is designed to meet the need for administrative, supervisory, and teaching personnel at the community college and technical institute levels.

Curriculum Guide

Administration: 30 S.H. Required

This program is designed for students who are interested in qualifying for State Certification as Administrator I (the principal's certification). Completion of this program does not qualify one for the graduate teaching certificate.

Students pursuing certification, but not the masters degree are required to complete at least 12 semester hours at this University.

Education 761, School Organization and Administration, is a prerequisite for all other professional courses in the specific areas of organization and administration, curriculum, instruction, and supervision (items 1b and 1c in the requirements outlined below).

1. *Courses*

- a. Foundations in Education—3 hours
Psy. 726—Educational Psychology
or
Ed. 701—Philosophy of Education
- b. Organization and Administration—6 hours selected from:
Ed. 760—The Junior High School
Ed. 761—Organization and Administration of Schools
Ed. 762—The Principalship
- c. Curriculum, Instruction and Supervision—6 hours selected from:
Ed. 720—Curriculum Development
Ed. 755—Supervision of Instruction
Ed. 756—Supervision of Student Teachers
- d. Cognate Disciplines—6 hours selected from:
Economics
Political Science
Sociology
Anthropology
- e. Internship—Administrative Field Experience—3 hours
Ed. 769—Problems in Educational Administration and Supervision
- f. Electives—6 hours

2. *Other Requirements*

- a. GRE (Aptitude and Advanced Test in Education)
- b. Master's Comprehensive in Education and in Administration
- c. Overall grade point average of 3.0 for all graduate courses

Curriculum Instructional Specialist: 30-33 S.H. Required

For the Curriculum Instructional Specialist's I (Master's Degree) certificate, the State of North Carolina requires five years of teaching and/or supervisory or administrative experience within the past eight years. A student will not be recommended for the North Carolina Curriculum Instructional Specialist's certificate without the minimum five years of experience specified above.

A. Requirements for Unconditional Admission

- 1. Baccalaureate degree from accredited undergraduate institution.
- 2. Overall average of 2.6 in undergraduate studies.
- 3. Class A Certificate (or qualifications for such a certificate).
- 4. Failure to meet any of these criteria may cause rejection of the application or may require additional undergraduate work to satisfy the requirements.

B. Courses in Education and Psychology—15 semester hours

- 1. Supervision—3 hours required
Education 755—Supervision of Instruction
Education 757—Problems in Supervision of the Elementary School
Education 758—Problems in High School Supervision
- 2. Curriculum—3 hours required
Education 720—Curriculum Development
Education 721—Curriculum in the Elementary School
Education 722—Curriculum in the Secondary School
- 3. The Nature of Learning and the Learning Process—3 hours required
Psychology 635—Educational Psychology and Learning
Psychology 726—Educational Psychology
Psychology 727—Child Growth and Development
- 4. Organization and Administration—3 hours required
Education 761—School Organization and Administration
- 5. Educational Research—3 hours required

Education 790—Seminar in Educational Problems

- C. Required Courses in Subject Matter to qualify for issuance of the graduate teacher's certificate—early childhood or intermediate, or secondary—12-18 semester hours.
- D. Electives—If 12 semester hours credit are used to satisfy C, 3 hours may be used as electives to meet the particular needs of the students.
- E. Other requirements
 - 1. Qualifying Examination
 - 2. Graduate Record Examination
 - 3. Master's Comprehensive Examination in Education
 - 4. Master's Comprehensive Examination in Supervision
 - 5. Overall grade point average of 3.0 for all courses

Total Number of Hours Required—30-33 (30 for those completing work for the supervisor's program at the Early Childhood Education level and the Intermediate Education level).

Elementary Education Curriculum (General): 30 S.H. Required

- A. Non-Thesis Option
 - 1. Courses Required
 - a. Research—Education 311-790
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727
 - (2) Current Critical Issues in American Education: Education 310-781
 - (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
 - (4) Curriculum: Education 310-683, Education 311-720, Education 310-721
 - c. Eighteen hours taken from English, fine arts (art and music), health and physical education, mathematics, science and social science
 - 2. Other Requirements
 - a. Qualifying Examination
 - b. Graduate Record Examination (Aptitude and Advanced Test in Education)
 - c. 3.0 grade point average for all graduate courses
 - d. Final comprehensive examination in education
- B. Thesis Option
 - 1. Courses Required
 - a. Research: Education 311-791
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727
 - (2) Current Critical Issues in American Education: Education 310-781
 - (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
 - (4) Curriculum: Education 310-683, Education 311-720, Education 310-721
 - 2. Other Requirements
 - a. Eighteen hours in no more than two of the academic disciplines specified in the description of the non-thesis program
 - b. Qualifying Examination
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education)

- d. Comprehensive Examination in Elementary Education
- e. Thesis Examination

Early Childhood Education Curriculum (Grades K-3): 30 S.H. Required

A. Non-Thesis Option

1. Courses Required
 - a. Research—Education 311-790
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727
 - (2) Current Critical Issues in American Education: Education 310-781
 - (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
 - (4) Curriculum: Education 310-683, Education 311-720, Education 310-721
 - c. Nine hours taken from English, fine arts (art and music), health and physical education, mathematics, science and social science
 - d. Nine hours of electives
2. Other Requirements
 - a. Qualifying Examination
 - b. Graduate Record Examination (Aptitude and Advanced Test in Education)
 - c. 3.0 grade point average for all graduate courses
 - d. Final comprehensive examination in education

B. Thesis Option

1. Courses Required
 - a. Research: Education 311-791
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727
 - (2) Current Critical Issues in American Education: Education 310-781
 - (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
 - (4) Curriculum: Education 310-683, Education 311-720, Education 310-721
2. Other Requirements
 - a. Eighteen hours in no more than two of the academic disciplines specified in the description of the non-thesis program
 - b. Qualifying Examination
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education)
 - d. Comprehensive Examination in Elementary Education
 - e. Thesis Examination

Intermediate Education Curriculum (Grades 4-8): 30 S.H. Required

A. Non-Thesis Option

1. Courses Required
 - a. Research—Education 311-790
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727

- (2) Current Critical Issues in American Education: Education 310-781
- (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
- (4) Curriculum: Education 311-720, Education 310-721
- c. Eighteen hours taken from English, fine arts (art and music), health and physical education, mathematics, science and social science
2. Other Requirements
 - a. Qualifying Examination
 - b. Graduate Record Examination (Aptitude and Advanced Test in Education)
 - c. 3.0 grade point average for all graduate courses
 - d. Final comprehensive examination in education
- B. Thesis Option
 1. Courses Required
 - a. Research: Education 311-791
 - b. Nine hours from the following areas appropriate to early childhood education
 - (1) The Nature of the Learner and the Learning Process: Psychology 320-726, Psychology 320-727
 - (2) Current Critical Issues in American Education: Education 310-781
 - (3) Historical, Philosophical and Sociological Foundations of Education: Education 311-625, Education 311-626, Education 311-701, Education 311-703
 - (4) Curriculum: Education 311-720, Education 310-721
 2. Other Requirements
 - a. Eighteen hours in no more than two of the academic disciplines specified in the description of the non-thesis program
 - b. Qualifying Examination
 - c. Graduate Record Examination (Aptitude Test and Advanced Test in Education)
 - d. Comprehensive Examination in Elementary Education
 - e. Thesis Examination

Counselor-Education (Guidance) Curriculum: 31 S.H. Required

The Master of Science degree program in Educational Psychology and Guidance is designed to prepare individuals for Counselor's Certification and/or Non-Certification at the Master's Level. Three areas of concentration are offered: 1) Counseling in schools, kindergarten through 12th grade, 2) Counseling in community and agency settings, 3) Counseling in manpower governmental units, local, state and national level. While the inter-relatedness of these program areas necessitate a common core of courses, there is sufficient uniqueness in the expected competencies to require some differentiation of sources and experiences. The prerequisites for admission to the program are: 1) Introduction to Guidance and/or its equivalency, and 2) a course in Educational Statistics or Psychological Measurement.

1. The Professional Core for all three tracks requires the following:

| Required Courses | | S.H. |
|-------------------------|------------------------------------|-------------|
| Education 701 | Philosophy of Education | 3 |
| Education 720 | Curriculum Development | 3 |
| | or | |
| Education 722 | Curriculum in the Secondary School | 3 |
| Guidance 623 | Personality Development | 3 |

| | | |
|--------------------|--|---|
| Guidance 706 | Organization and Administration of Guidance Services | 3 |
| Guidance 716 | Techniques of Individual Analysis | 3 |
| Guidance 717 | Educational and Occupational Information | 3 |
| Guidance 718 | Introduction to Counseling | 3 |
| Guidance 720 | Principles and Dynamics of Group Counseling | 3 |
| Guidance 726 | Educational Psychology | 3 |
| Guidance 730 (705) | Guidance Practicum | 3 |

Addition of courses to the Department:

| | | |
|--|---|---|
| Guidance 722 | Career Education and Vocational Development Theories | 3 |
| Guidance 723 | Student Personnel Services in Post-Secondary Education | 3 |
| Guidance 724 | Advanced Counseling Theories, Strategies and Techniques | 3 |
| Courses in Adult Education, Anthropology, Economics, Political Science and Sociology | | 6 |

2. Other Requirements

- Graduate Record Examination (Aptitude and Advanced Test in Education).
- 3.0 grade point average or better for graduate courses.
- Final comprehensive examination in Guidance and in Education.

Reading Education Curriculum: 30 S.H. Required

The Reading Education Curriculum has two distinct approaches to certification, namely Option I and Option II. Option I is for those students who wish to complete Class A or graduate level certification, while Option II is for those students desiring to complete a degree program in Reading.

A. Option I: Requires 18 semester hours from the following.

Reading—15 semester hours

| | | |
|---------|-----------------------------------|--------|
| 310-630 | Foundations in Reading | 3 s.h. |
| 310-635 | Reading Through the Primary Years | 3 s.h. |
| 310-636 | Reading in the Elementary Grades | 3 s.h. |
| 310-638 | Classroom Diagnosis in Reading | 3 s.h. |
| 310-639 | Reading Practicum | 3 s.h. |
| 310-637 | Reading in the Secondary School | 3 s.h. |
| 310-739 | Reading in the Content Areas | 3 s.h. |
| 310-640 | Reading for the Atypical Learner | 3 s.h. |

The following courses shown in the list above are required for State Certification in Reading, Class A or G: Education 630, 635 or 636 or 637, 638, 739.

Cognate Areas—3 semester hours

| | | |
|---------|---|--------|
| 350-706 | Media in Special Education and Reading | 3 s.h. |
| 212-626 | Children's Literature | 3 s.h. |
| 212-710 | Language Arts for Elementary Teachers | 3 s.h. |
| 212-754 | History and Structure of the English Language | 3 s.h. |

Other Requirements

- Overall grade point average of 3.0 for all graduate courses
- Comprehensive Examination

B. Option II: A total of 30 semester hours are required. This program leads to the Master of Science in Reading

| | | |
|---------------------------|--|--------|
| Reading—18 semester hours | | |
| 310-630 | Foundations in Reading | 3 s.h. |
| 310-635 | Reading Through the Primary Years | 3 s.h. |
| 310-636 | Reading in the Elementary Grades | 3 s.h. |
| 310-638 | Diagnosis in Reading | 3 s.h. |
| 310-640 | Reading for the Atypical Learner | 3 s.h. |
| 310-739 | Reading in the Content Areas | 3 s.h. |
| 310-741 | Advanced Diagnosis | 3 s.h. |
| 310-742 | Organization and Administration of Reading Program | 3 s.h. |
| 310-743 | Advanced Practicum | 3 s.h. |
| 310-744 | Seminar and Research in Reading | 3 s.h. |

Foundations of Education Courses—3 semester hours required

| | | |
|---------|-------------------------------------|--------|
| 311-626 | History of American Education | 3 s.h. |
| 311-701 | Philosophy of Education (or) | 3 s.h. |
| 311-703 | Educational Sociology | 3 s.h. |
| 311-625 | Theory of American Public Education | 3 s.h. |
| 320-726 | Educational Psychology (or) | 3 s.h. |
| 320-727 | Child Growth and Development | 3 s.h. |

Curriculum in Education—3 semester hours required

| | | |
|---------|--|--------|
| 310-683 | Curriculum in Early Childhood | 3 s.h. |
| 310-721 | Curriculum in the Elementary School (or) | 3 s.h. |
| 311-720 | Curriculum Development (or) | 3 s.h. |
| 311-722 | Curriculum in the Secondary School | 3 s.h. |

Cognate Areas—6 semester hours required

| | | |
|---------|---|--------|
| 350-706 | Media in Special Education and Reading | 3 s.h. |
| 212-626 | Children's Literature | 3 s.h. |
| 212-710 | Language Arts for Elementary Teachers | 3 s.h. |
| 212-754 | History and Structure of the English Language | 3 s.h. |

If a student has already earned 18 semester hours in Reading at the Class A or graduate level for state certification purposes then he/she may elect additional hours necessary to complete requirements from the following courses with academic advisement.

Required Reading Courses for the M.S. Degree in Reading

| | | |
|---------|--|--------|
| 310-630 | Foundations in Reading (or) | 3 s.h. |
| 310-740 | Problems in the Improvement of Reading | 3 s.h. |
| 310-635 | Reading Through the Primary Years (or) | 3 s.h. |
| 310-636 | Reading in the Elementary Grades (or) | 3 s.h. |
| 310-637 | Reading in the Secondary School | 3 s.h. |
| 310-734 | Advanced Practicum in Reading | 3 s.h. |
| 310-638 | Classroom Diagnosis in Reading (or) | 3 s.h. |
| 310-741 | Advanced Diagnosis in Reading | 3 s.h. |
| 310-742 | Organization and Administration of Reading Program | 3 s.h. |
| 310-744 | Seminar and Research in Reading | 3 s.h. |

Cognate Areas

| | | |
|---------|---|--------|
| 350-706 | Media in Special Education and Reading | 3 s.h. |
| 212-710 | Language Arts for Elementary Teachers | 3 s.h. |
| 212-754 | History and Structure of the English Language | 3 s.h. |

Safety and Driver Education: 30 S.H. Required

The program of Safety and Driver Education prepares qualified individuals for

careers as safety and driver education teachers, school district safety supervisors, professional personnel for leadership roles at state and federal levels.

1. Required Courses
 - a. Six hours from the following areas in Education
 - (1) The Nature of the Learner and the Learning Process
 - (2) Current Critical Issues in American Education
 - (3) Historical, Philosophical, and Sociological Foundations of Education
 - (4) Curriculum, Supervision, etc.
 - b. Eighteen hours in Safety and Driver Education (SDE 653, 756, and 757 are required courses)
 - c. Three hours of electives
 - d. Thesis (optional)
2. Other Requirements
 - a. A minimum of 3.0 grade point average for all graduate courses
 - b. Final comprehensive examination in Education and Safety and Driver Education.
 - c. Qualifying Examination

Secondary Education Curriculum: 30 S.H. Required

Candidates following the secondary education program must select one of the following academic areas of concentration: (1) Art, (2) Biology, (3) Chemistry, (4) English, (5) French, (6) Health and Physical Education, (7) Mathematics, (8) History, (9) Science, or (10) Social Science.

1. Courses
 - a. Non-thesis Option: 6 hours from the following areas:
 - (1) Research
 - (2) The Nature of the Learner and the Learning Process
 - (3) Current Critical Issues in American Education
 - (4) Historical, Philosophical and Sociological Foundations of Education
 - (5) Curriculum, Supervision, etc.
 - b. Thesis Option: 6 hours from the following areas:
 - (1) Research
 - (2) The Nature of the Learner and the Learning Process
 - (3) Current Critical Issues in American Education
 - (4) Historical, Philosophical and Sociological Foundations of Education
 - (5) Curriculum, Supervision, etc.
2. Other Requirements
 - a. Students in a non-thesis program may take either Education 799 (Seminar) or a seminar in the area of concentration. Students in a thesis program may take Education 791 (Thesis) or a thesis research course offered in the area of concentration. In all instances, the decision is to be made in consultation with the adviser.
 - b. Graduate Record Examination (Aptitude Test and Advanced Test in area of concentration).
 - c. 3.0 grade point average for all graduate courses
 - d. Final comprehensive examination in Education and area of concentration.

For details of the specific requirements in each area of concentration, see the descriptive material for the department offering the concentration.

MASTER OF SCIENCE IN ENGINEERING

The School of Engineering, through its graduate division, offers a program of advanced study leading to the degree of Master of Science in Engineering. Formal instruction is offered in several areas of engineering such as electrical systems, engineering mechanics, industrial operations, mechanical systems, structural

engineering, and structural mechanics. However, the instructional areas are not limited to the abovementioned areas. The programs reflect interdisciplinary emphases and are coordinated by the student's Advisory Committee in such a way as to meet the professional needs and experiences of the individual candidate.

Requirements for Admission to a Degree Program

1. Applicants must be accepted into the Graduate School, and approval of qualifications must be made by the Dean of the School of Engineering.
2. Successful completion of a program which is to be worked out by the student's Advisory Committee and approved by the Engineering Graduate Committee. At least 20 semester hours must be in engineering courses. Elective courses may be selected from mathematics, chemistry, or other appropriate disciplines.
3. Completing a minimum of 30 semester hours including a thesis of 6 semester hours, or completing a minimum of 33 semester hours.
4. B Average in course work.
5. Passing a final comprehensive examination.

MASTER OF SCIENCE IN FOOD AND NUTRITION

The Department of Home Economics offers the Master of Science in Food and Nutrition. This program requires a minimum of 30 semester hours and has two options, Option A and B.

Option A is designed to prepare students for the advanced degree in Food and Nutrition and related areas, and careers in food research, nutrition, food testing, food demonstrating, clinical nutrition, dietetics, extension service and teaching. For admission to this program, applicants should have majored in one or more of the following areas: basic food, nutrition (human or animal), biochemistry, mathematics, biology, and physiology.

Option B is designed to prepare students for careers in applied nutrition. This program has two options, thesis and non-thesis. Students with a major interest in dietetics, public service careers, anthropology, sociology, economics, education and teaching at any level from the kindergarten to the college may enter into the program. Option B has the flexibility for students to write a thesis or to choose extra course work. Both opportunities have meaningful value in relation to students' interests, specialization, and career goals.

OPTION A—M.S. in Food and Nutrition (Thesis program)— 30 Semester hours

All credentials of the students are subject to evaluation of the Graduate Faculty of the Department of Home Economics at least four weeks prior to admission.

A. Requirements for Admission

1. Baccalaureate degree from an accredited undergraduate institution.
2. Overall average of 2.6 in undergraduate studies.

B. General Departmental Requirements

1. The undergraduate program should have included one year of each of the following: general chemistry and organic chemistry.
2. Qualified applicants should have had at least one course in each of the following areas: quantitative analysis, biochemistry, basic nutrition, diet therapy, and food science (experimental cookery).
3. Failure to meet any of the above requirements may necessitate taking of undergraduate courses to meet deficiencies.
4. Admission to candidacy for the M.S. in Food and Nutrition requires the satisfactory completion of a qualifying examination in Food and Nutrition. This ex-

amination is in addition to the qualifying essay required by the Graduate School. (To be taken prior to the close of the first semester of the student's entrance to the program).

C. The Core Courses for Option A (Thesis)

A total of 17 semester hours to be selected from Food and Nutrition courses including:

Home Economics 730—Nutrition in Health and Disease (prerequisite Home Economics 630—Advance Nutrition or equivalent)

Home Economics 735—Experimental Food Science (prerequisite 436—Introduction to Food Science or equivalent)

Home Economics 736—Research Methods in Food and Nutrition (prerequisite 635—Introduction to Research Methods)

* Special Note: Prerequisite courses will not count in the 30 minimum required hours.

Related Courses

Four credit hours should be selected in any related area of food and nutrition courses above 700 level. (ex. 734, 744, 733)

D. Electives

10 Semester Hours

To be selected across interdisciplinary areas, in consultation and with written approval of the advisor.

Suggested electives in the following courses:

- | | |
|--|-----------|
| 1. 651—Biochemistry | 5 credits |
| 2. 629—Applied Statistics | 3 credits |
| 3. 642—Methods of Radioisotope Techniques | 3 credits |
| 4. 665—Histochemical Technique or any other or equivalent course | 3 credits |
| 5. 650—Experimental Psychology | 3 credits |
| 6. 690—Special Problems in Poultry | 3 credits |
| 7. 690—Selection of Meat and Meat Products | 3 credits |
| 8. 703—Advanced Livestock Production | 3 credits |

One free elective

E. Thesis

3 Semester Hours

F. Other Requirements

- Graduate Record Examination (Aptitude Test and Advanced Test)
- Final comprehensive examination in Food and Nutrition—It can be taken only if a student has maintained a 3.0 grade point average in the Graduate courses and work at the 600 level or above, and has completed the Departmental Qualifying Examination and Qualifying Essay Examination.
- 3.0 grade point average overall for all graduate courses.
- Satisfactory presentation and defense of thesis (if thesis is presented.)

**OPTION B—Master of Science in Food and Nutrition (concentration in Applied Nutrition). Thesis and non-thesis programs.
Minimum 30 semester hours**

All credentials of the students are subject to evaluation of the Graduate Faculty of the Department of Home Economics at least four weeks prior to admission.

A. Requirements for Admission

- Baccalaureate degree from an accredited undergraduate institution.
- Overall average of 2.6 in undergraduate studies.

B. General Departmental Requirements

- All students who have not had any courses in Food and Nutrition must take Home Economics 537, Review of Scientific Principles in Food and Nutrition. This course will count as a prerequisite to Option B in such cases, and will be in addition to the 30 semester hours and may not serve as an elective.

2. Both thesis and non-thesis program applicants may be requested to take a Diagnostic Test in Food and Nutrition to evaluate their strengths and weaknesses. This test must be taken prior to registration.
 3. The non-thesis program may require more course work. The advisor should be consulted.
 4. Non-thesis programs must include Home Economics 745, Practicum in Food or Nutrition.
 5. Electives—9 hours
To be selected across the interdisciplinary areas, in consultation and with written approval of the advisor.
 6. Admission to candidacy for the M.S. in Food and Nutrition requires the satisfactory completion of a qualifying examination in Food and Nutrition. This examination is in addition to the qualifying essay required by the Graduate School. (To be taken prior to the close of the first semester of the student's entrance to the program).
- C. The Core Courses for Option B (Thesis and Non-Thesis)
- | | |
|---|------------------|
| Home Economics 736—Research Methods in Food and Nutrition, or its equivalent, Sociology 671, Advanced Research Methods (prerequisite—Math 624). | 4 Semester Hours |
| Home Economics 740—Community Nutrition | 3 Semester Hours |
| Home Economics 741—Cultural and Social Aspects of Food | 3 Semester Hours |
- * Special Note: Prerequisite courses will not be counted in the minimum 30 required hours.
- D. Thesis Option
- | | |
|--------------------------------------|-------------------|
| Core Courses (see Section "C" above) | 10 Semester Hours |
| Thesis | 3 Semester Hours |
| Electives | 9 Semester Hours |
- To be selected to support the area of specialization. Electives should be 600 and above level courses selected from the following suggested disciplines:
1. Computer Science
 2. Home Economics Education
 3. Journalism
 4. Child Development
 5. Psychology
 6. Agricultural Education
 7. Sociology
- | | |
|--------------------|------------------|
| Food and Nutrition | 8 Semester Hours |
|--------------------|------------------|
- To be selected from following courses
1. Home Economics 734
 2. Home Economics 733
 3. Home Economics 744
 4. Home Economics 738
 5. Home Economics 741
- E. Non-Thesis Option
- | | |
|--------------|-------------------|
| Core Courses | 10 Semester Hours |
|--------------|-------------------|
- See Section "C" above
- | | |
|--------------------|------------------|
| Home Economics 745 | 3 Semester Hours |
|--------------------|------------------|
- | | |
|-----------|------------------|
| Electives | 9 Semester Hours |
|-----------|------------------|
- To be selected to support the area of specialization. Electives should be 600 and above level courses selected from the following suggested disciplines.
1. Computer Science
 2. Home Economics Education
 3. Journalism
 4. Child Development

5. Psychology
6. Agricultural Education
7. Sociology

Food and Nutrition

14 Semester Hours

To be selected from following courses

1. Home Economics 734
2. Home Economics 733
3. Home Economics 744
4. Home Economics 738
5. Home Economics 741
6. Home Economics 730 without lab
7. Home Economics 735 without lab

F. Other requirements

- a. Graduate Record Examination (Aptitude Test and Advanced Test)
- b. Final comprehensive examination in Food and Nutrition—It can be taken only if a student has maintained a 3.0 grade point average in the Graduate courses and work at the 600-level or above, and has completed the Departmental Qualifying examination and the Qualifying Essay Examination.
- c. 3.0 grade point average overall for all graduate courses.
- d. Satisfactory presentation and defense of thesis (if thesis is presented).

MASTER OF SCIENCE DEGREE IN INDUSTRIAL EDUCATION

The Department of Industrial Education offers the Masters Degree in Industrial Education to persons desiring graduate level certification in teaching, supervision, and administration of industrial subjects in secondary and postsecondary schools. Areas of concentration in this program are: (1) Industrial Arts teaching; including middle grades occupational exploration; (3) Trade and Industrial teaching; including industrial cooperative education, and administration and supervision of industrial and technical education.

Persons in postsecondary and in the private sector of vocational and technical education desiring to pursue a master's degree in Industrial Education, who do not hold a class "A" certificate in Industrial Arts or Trade and Industrial Education are encouraged to consider a major in Postsecondary Education (Teaching or Administration) with a 15 semester hour subject matter concentration in Industrial Education.

Requirements for Admission To a Degree Program

1. Baccalaureate degree from accredited undergraduate institution.
2. Class A certificate in Industrial Arts or Vocational-Occupational Education.
3. Satisfactory completion of all Graduate School requirements for admission to candidacy for a degree.
4. Failure to meet any of these criteria may necessitate rejection of the application or the requirement of additional undergraduate work.

General Requirements for a Degree: 30 Semester Hours

1. Required Courses: Industrial Arts or Trade and Industrial Education: 15 s.h.

| | |
|---|------|
| Research, Ed. 710; IE 767; PE 785 | S.H. |
| Curriculum, Ed. 720, 722; IE 662, 766 | 3 |
| Evaluation in Industrial Education, IE 765 | 3 |
| Research Seminar or Thesis, Ed. 790, Ed. 791; IE 768, IE 769 | 3 |
| Education or Psychology, Ed. 625, 660, 701, 703; Psy. 661, 726, 727 | 3 |
2. Industrial Education Options: 12 s.h.
 - a. Option I. Industrial Arts Education

| | |
|---|--|
| Ind. Ed. 616, 617, 618, 619, 620, 635, 664, 715, 717, 718, 719, 731, 762; | |
|---|--|

- | | |
|--|----|
| Ind. Tech. 651, 673, 735; Guid 717 | 12 |
| b. Option II. Trade and Industrial Education | |
| Ind. Ed. 660, 661, 663, 762, 763, 764; | |
| Ed. 602, 603, 605, 700, 690, 776, 778, 779 | 12 |
| ECON 602, 604 | 3 |
3. Electives
 4. Other Requirements
 - a. Graduate Record Examination (Aptitude Test and Advanced Test in Education).
 - b. 3.0 grade point average for all graduate courses.
 - c. Final comprehensive examination in Industrial Education.

**DEPARTMENT OF ADMINISTRATION, SUPERVISION AND
POSTSECONDARY EDUCATION
S. Joseph Shaw, Acting Chairperson
Office: 112 Hodgkin Hall**

For Advanced Undergraduates and Graduates

312-690. The Community College and Postsecondary Education Credit 3(3-0)

Philosophy, organization and character of school programs needed to meet educational needs of individuals who desire to continue their education on the postsecondary level. Special attention is given to the trends in developing community colleges. Prerequisites: Education 727, or a graduate course in high school curriculum, Psychology 726, or graduate course in educational psychology, or three or more years of teaching experience.

Graduate Courses

312-755. Supervision of Instruction Credit 3(3-0)

Modern concepts and techniques of supervision; the roles of the supervisor, principal, and consultant in curriculum development; and the procedures, problems, and materials of supervising and improving instruction in grades 1-12.

312-756. Supervision of Student Teachers Credit 3(3-0)

A basic professional course for classroom teachers, principals, and supervisors who serve in an official capacity directing the field-laboratory experiences of student teachers.

312-757. Problems in Supervision of the Elementary School Credit 3(3-0)

The nature, theory, and practice of supervision, and the supervisor's role in improvement of instruction.

312-758. Problems in High School Supervision Credit 3(3-0)

A study of problems, techniques, and materials in the improvement of instruction in secondary schools. A course for principals, heads of departments, and supervisors.

312-760. The Junior High School Credit 3(3-0)

The philosophy, organization, administration, curriculum and activities of the junior high school.

312-761. School Organization and Administration Credit 4(4-0)

A comprehensive course in organization and administration of schools, grades K-12, placing primary emphasis on the following areas: (1) formal and informal organizational structure, concepts and practices; (2) the management processes; (3)

the administrative functions, with particular reference to personnel, program, and fiscal management; and, (4) leadership styles and the leadership role, with special attention to planning, decision-making, and conflict-resolution.

312-762. The Principalship

Credit 3(3-0)

A professional education course for the principalship; examines the role of the principal in the modern school system with emphasis on planning, programming, and management functions.

312-763. Public School Administration

Credit 3(3-0)

Review of school administration, the organization and structure of the school system; agencies of administration and control, legal basis of school administration, standards for administration in the various functional areas.

312-764. Pupil Personnel Administration

Credit 3(3-0)

Pupil accounting, records and reports, financial reports, school census, special school reports, pupil adjustment and progress, health and safety, and legal aspects of pupil administration.

312-765. School Publicity and Public Relations

Credit 3(3-0)

Study of the interrelationships between the lay community and the schools. Appraisal and procedures, actual or proposed, for improvement of the relationships.

312-766. School Planning

Credit 3(3-0)

An examination of the principles governing the selection and landscaping of school grounds, location and design of buildings, and care of plant from standpoint of use, sanitation, health and attractiveness.

312-767. Public School Finance

Credit 3(3-0)

A current study of the political, legal, and economic aspects of financing public education, with particular attention to school finance in North Carolina. Major areas include: (1) public education and the national economy; (2) the tax structure and sources of revenue, (3) resource allocation and methods of funding; (4) school finance reform; (5) school finance in North Carolina; and, (6) practical experience in budget planning and development.

312-768. Principles of School Law

Credit 3(3-0)

An analysis of the legal aspects of public education. Constitutional, statutory, and case law, with special attention to North Carolina law, provide the basis for understanding the legal framework and examining legal principles pertaining to such areas as: (1) church-state-education relations; (2) race-state-education relations; (3) school districts; (4) school boards; (5) finance; (6) curriculum; (7) property; (8) teacher personnel; and, (9) pupil personnel.

312-769. Problems in Educational Administration and Supervision

Credit 3(3-0)

An internship of field study on a supervised project arising out of the needs of the student. Prerequisite: 15 graduate hours, including Organization and Administration, Supervision, and Curriculum.

312-776. Principles of College Teaching

Credit 3(3-0)

Principles involved in teaching at the college level; techniques of teaching aids, criteria used in evaluation. Prerequisite: Psychology 726, or graduate course in educational psychology.

312-777. Seminar in Postsecondary Education Credit 3(3-0)

A synthesis of current research in postsecondary education relating to administration, curriculum, and faculty development. Prerequisite: Education 690.

312-778. Student Personnel Services Credit 3(3-0)

Analysis of student development programs in postsecondary institutions, including pre-admission, educational, vocational, and personal counseling; career guidance services, attitude and interest assessment, student affairs, rights and responsibilities, and financial aid.

312-779. Technical Education in Community Junior Colleges Credit 3(3-0)

Offers techniques in identifying community needs and in planning curriculums and courses for technical/vocational education. Stresses the role of the two-year college in middle manpower development.

312-781. Internship Credit 3(3-0)

Offers opportunities for students to spend one semester as a teaching or administrative intern in a community college or technical institute in the North Carolina Community College System. Registration only by permission of the instructor.

312-A785. Independent Readings in Education I Credit 1(0-2)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

312-A786. Independent Readings in Education II Credit 2(0-4)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

312-A787. Independent Readings in Education III Credit 3(0-6)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

312-A790. Seminar in Education Problems Credit 3(3-0)

Intensive study, investigation, or research in selected areas of education; reports and constructive criticism. Prerequisite: A minimum of 24 hours in prescribed graduate courses.

312-A791. Thesis Research Credit 3(3-0)

312-792. Advanced Seminar and Internship in Education Administration Credit 3(3-0)

Seminar and supervised internship experiences relating to problems in administration and to the needs and interests of the student (Restricted to students in the Sixth-Year Program in Administration.)

ADULT EDUCATION
B. W. Harris, Chairman
Office: Center for Continuing Education

Advanced Undergraduates and Graduates

340-651. Introduction to Adult Education Credit 3(3-0)

The purpose is to develop a view of Adult Education as a broad, diverse, and complex field of study, research and professional practice. Students will survey many in-

stitutions, firms, programs, and individual activities for insights into the scope of Adult Education, its client groups, their reasons for become adult learners, and the range of methods and materials used to enable adults to learn.

340-652. Methods in Adult Education
(Formerly Adult Ed. 671)

Credit 3(3-0)

Methods of informal instruction, group leadership, conference planning and techniques in handling various issues of interest to adults. For persons preparing to conduct adult education programs as well as those preparing to serve as instructors or leaders in the public schools and/or in various agencies serving adults.

340-653. Adult Development and Learning

Credit 3(3-0)

The focus is on adult development psychology and learning theory. Adult development and learning is grounded in human developmental psychology, and enables students to investigate the life. From the research literature of adult life stages, students will be asked to read works of Freud, Havinghurst, Erikson, Gould, Levinson, Vaillant, and Klemme.

340-654. Gerontology

Credit 3(3-0)

The basic purpose of this course is to study the process of aging. Attention will be given to the influence of cultural, sociological, and economic factors. An important phase of the course will deal with planning for retirement.

340-650. Special Problems in Adult Education

Credit 3(3-0)

Special topics, individual and group study projects, research, workshops, seminars, summer institutes, travel study tours and organized visitations in areas of adult education worked out and agreed upon by participating students and the department of Adult Education and Community Services.

Courses Restricted to Graduate Students Only

340-700. History and Philosophy of Adult/Continuing Education

Credit 3(3-0)

A study of historical and philosophical foundations and thought which have influenced how adult needs have been met through learning. Consideration will be given to the thinking upon which teaching and learning were based during ancient times through the present time.

**340-701. Organization, Administration, and Supervision of
Adult/Continuing Education Programs**

Credit 3(3-0)

An examination of theories, concepts, and practices as related to the functions, planning, organizing, staffing, financing, motivating, decision-making, evaluating, and delegating in an Adult Education organization.

340-702. Practicum in Teaching Adults

Credit 3(1-4)

Practical experience in involving a group of adults in a teaching-learning experience. Under supervision, the practice teacher will have an opportunity to apply concepts, teaching methods, and instructional materials in a real life situation. Prerequisites: Adult Edu. 651, 653, and 700.

**340-703. Seminar on Contemporary Issues in
Adult/Continuing Education**

Credit 1(1-0)

This course is integrative in nature, thereby offering the student an opportunity to synthesize concepts, theories, and methods of teaching learned in earlier courses. Students will be encouraged to further explore areas of special interest.

340-704. Independent Study

Credit 2(2-0)

This course permits a student to undertake an analysis of a problem, through individual study outside the traditional classroom setting. The problem may be selected from either travel, hobby, or a related job experience. Prerequisite: Permission of the Instructor.

340-705. Thesis Research in Adult Education

Credit: To be arranged

AGRICULTURAL EDUCATION**A. P. Bell, Chairperson****Office: 242 Carver Hall**

The Department of Agricultural Education offers programs leading to the Master of Science Degree. The programs are designed to meet the needs of individual students and emphasize the professional improvement of teachers and professional workers in related areas. They provide advanced preparation for employment in administration, supervision, teacher education, and research in agricultural education and related fields.

Advanced Undergraduate and Graduate**110-601. Adult Education in Occupational Education**

Credit 3(3-0)

(Formerly Ag-Ed 1271)

A study of the principles and problems of organizing and conducting programs for adults. Emphasis is given to the principles of conducting organized instruction.

110-603. Problem Teaching in Agricultural Education

Credit 3(3-0)

(Formerly Ag-Ed 1273)

Practice in setting up problems for teaching unit courses in vocational agriculture.

110-604. Public Relations in Vocational Agriculture

Credit 3(3-0)

(Formerly Ag-Ed 1274)

Principles and practices of organizing, developing, and implementing public relations for promoting local programs.

110-605. Guidance and Group Instruction in Occupational Education

(Formerly Ag-Ed 1275)

Credit 3(3-0)

Guidance and group instruction applied to agricultural occupations and other problems of students in vocational education.

110-606. Cooperative Work-Study Programs

Credit 3(3-0)

Principles, theories, organization, and administration of cooperative work experience programs.

110-607. Environmental Education

Principles and practices of understanding the environment and the interrelated complexities of the environment. The course will include a study of agricultural occupations related to the environment and materials that need to be developed for use by teachers of agriculture and other professional workers.

Ag-Ed 608. Agricultural Extension Organization and Methods

Credit 3(3-0)

Principles, objectives, organization, program development, and methods in cooperative extension.

Ag-Ed 609. Community Analysis and Rural Life Credit 3(3-0)

Educational processes, structure and function of rural society, and the role which diverse organizations, agencies, and institutions play in the education and adjustment of rural people to the demands of modern society.

Ag-Ed 664. Occupational Exploration for Middle Grades Credit 3(3-0)

Designed for persons who teach or plan to teach middle grades occupational exploration programs. Emphasis will be placed on occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education. This course will be taught in cooperation with the departments of Business Education and Administrative Services, Home Economics, and Industrial Education.

**Ag-Ed 665. Occupational Exploration in the Middle Grades—
Agricultural Occupations** Credit 3(3-0)

Emphasis will be placed on curriculum, methods and techniques of teaching, and resources and facilities for teaching in the agricultural and environmental occupations cluster including Agribusiness and Natural Resources, Environmental Control, Hospitality and Recreation, and Marine Science.

For Graduate Students Only

110-700. Seminar in Agricultural Education Credit 1(1-0)
(Formerly Ag-Ed 1285)

A review of current problems and practices in the field of agricultural education.

110-702. Methods and Techniques of Public Relations Credit 3(3-0)
(Formerly Ag-Ed 1286)

A study of the means and methods of promoting and publicizing local community programs.

110-703. Scientific Methods in Research Credit 3(3-0)

Methods of procedures in investigation and experimentation in education, accompanied by critical examination of studies made in agricultural education and related fields. A research problem is developed under the supervision of the staff.

110-704. Philosophy of Occupational Education Credit 3(3-0)
(Formerly Ag-Ed 1288)

This course deals with the underlying philosophy and basic principles of vocational education. Emphasis is placed upon the factors contributing to the nature, purpose, scope, organization, and administration of vocational education in agriculture.

110-705. Recent Developments and Trends in Agricultural Education Credit 3(3-0)
(Formerly Ag-Ed 1289)

The course includes an intensive treatment of the various subject matter fields to keep teachers up-to-date technically as well as professionally. It is designed to cover the developments and trends in agricultural education.

706. Comparative Education in Agriculture Credit 3(3-0)

Emphasis will be placed on basic development concepts and principles. Various types of education and their implication to agriculture will be studied to develop an understanding of international developments in agriculture. Students may meet course requirements by studying and working in a developing country. (Enrollment by permission of department)

707. Issues in Community Development and Adult Education Credit 3(3-0)

Analysis of major issues and problems confronting rural and/or urban education in the United States and other countries with implications for program planning and development. Special attention will be given to adult education and community development. Students may meet course requirements by studying and working in other countries. (Enrollment by permission of department)

110-705. Community Problems Credit 3(3-0)
(Formerly Ag-Ed 1290)

A study of the common problems of the community that relate to agriculture and related areas and of solutions for these problems.

110-751. Methods and Techniques of Supervision in Agricultural Education Credit 3(3-0)
(Formerly Ag-Ed 1291)

The course includes the common methods and techniques that should be used in organizing and supervising agricultural education on state and local levels. In addition, the course will include supervision of student teaching.

110-752. Administration and Supervision Credit 3(3-0)
(Formerly Ag-Ed 1292)

A study of administrative and supervisory problems; the practices and policies of local, state, and federal agencies dealing with administration and supervision of vocational education.

110-753. Program Planning Credit 3(3-0)
(Formerly Ag-Ed 1293)

Consideration is given to the community as a unit for program planning in agricultural education. Special emphasis on collecting and interpreting basic data for formulating objectives, developing and evaluating community programs.

110-754. History of Agricultural Education Credit 3(3-0)
(Formerly Ag-Ed 1294)

Historical development, social and philosophical foundations, and current status in relation to the total vocational education program. Special attention is given to agricultural education as it developed in the United States.

110-706. Thesis Research in Agricultural Education Credit 3 sem hrs.

ANIMAL SCIENCE
George A. Johnson, Chairperson
Office: Ward Hall

ANIMAL SCIENCE

Advanced Undergraduate and Graduate

120-601. Principles of Animal Nutrition Credit 3(3-0)
(Formerly A.H. 1371)

A study of fundamentals of modern animal nutrition including classification of nutrients, their general metabolism and role in productive functions. (Prerequisite: A.H. 404.)

120-602. Animal Science Seminar Credit 1(1-0)
(Formerly A.H. 1372)

A review and discussion of current literature pertaining to all phases of animal husbandry.

120-603. Advanced Livestock Management Credit 3(3-0)
(Formerly A.H. 1373)

Special work in problems dealing with feeding, breeding, and management in the production of beef cattle, sheep and swine.

For Graduate Students Only

120-690. Selection of Meat and Meat Products Credit 3(2-2)
(Formerly A.H. 1385)

Identification, grading, and cutting of meats.

120-702. Advanced Livestock Marketing Credit 3(3-0)

Survey of recent research and developments in the methods of marketing livestock, and problems involved in the marketing process.

120-703. Advanced Livestock Production Credit 3(2-2)

Review of research relating to various phases of livestock production; fitting the livestock enterprise into the whole farm system. Special attention to overall economic operation.

DAIRY SCIENCE

Advanced Undergraduate and Graduate

120-604. Dairy Seminar I Credit 1(1-0)
(Formerly Dairy Husb. 2374)

Research on subjects relating to the dairy industry and methods of preparing and presenting such research.

120-605. Dairy Seminar II Credit 1(1-0)

A continuation of 604. (Formerly Dairy Husb. 1375)

ART

LeRoy F. Holmes, Chairperson
Office: Frazier Hall

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree program in Education, a student wishing to be accepted as a candidate for the degree, Master of Science in Education with a concentration in art, must hold or be qualified to hold a "Class A" teaching certificate in art. The areas covered should be: painting, ceramics, or sculpture, design, art history, and crafts. Each applicant for admission is required to submit a portfolio of his/her work.

A student who fails to meet these qualifications will be expected to satisfy these requirements by enrolling in appropriate undergraduate courses before beginning his/her graduate studies in art.

Requirements for a Degree

Non-thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a

Master of Science degree in Education, the student must complete the following: Art 720, 721, 722, and nine additional hours of art selected from the following courses: 602, 603, 604, 605, 606, 607, and 608. A student must also take 6 semester hours of electives in art, education or related fields.

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, the student must complete the following: Art 720, 721, 722, and nine additional hours of art selected from the following courses: 602, 603, 604, 605, 606, 607, and 608. A student must also take 3 semester hours of electives in art, education or related fields, and thesis.

Advanced Undergraduate and Graduate

211-600. Public School Art Credit 3(3-0)
(Formerly Art 3270)

Study of materials, methods, and procedures in teaching art in public schools. Special emphasis is placed on selection and organization of materials, seasonal projects, and lesson plans.

211-602. Seminar in Art History Credit 3(3-0)
(Formerly Art 3272)

Investigation in depth of the background influences which condition stylistic changes in art forms by analyzing and interpreting works of representative personalities.

211-603. Studio Techniques Credit 3(0-6)
(Formerly Art 3272)

Demonstrations that illustrate and emphasize the technical potentials of varied media. These techniques are analyzed and discussed as a point of departure for individual expression.

211-604. Ceramics Workshop Credit 3(0-6)
(Formerly Art 3274)

Advanced studio problems and projects in ceramics with emphasis on independent creative work. The student is given opportunity for original research and is encouraged to work toward the development of a personal style in the perfection of technique.

211-605. Printmaking Credit 3(0-6)
(Formerly Art 3275)

Investigation of traditional and experimental methods in printmaking. Advanced studio problems in woodcut etching, lithography, and serigraphy.

211-606. Sculpture Credit 3(0-6)
(Formerly Art 3276)

Further study of sculpture with an expansion of techniques. Individual problems for advanced students.

211-607. Project Seminar Credit 2(0-4)
(Formerly Art 3277)

Advanced specialized studies in creative painting, design, and sculpture. By means of discussion and suggestions, this seminar intends to solve various problems which might arise in each work. Prerequisite: Consent of the instructor.

211-608. Arts and Crafts
(Formerly Art 3278)

Credit 3(0-6)

Creative experimentation with a variety of materials, tools, and processes: projects in wood, metal construction, fabric design, and leather craft.

For Graduates Only

720. Methods of Criticism, Interpretation, and Research
(Formerly 3285)

Credit 3(3-0)

Investigation of the theories of art, methods of criticism and their application.

721. Research and Analysis
(Formerly 3286)

Credit 3(2-2)

Individual projects relating to contemporary art in Europe and America. Two hours lecture and two hours studio or conference per week.

722. Seminar in Art Education
(Formerly 3287)

Credit 3(2-2)

Special problems in the teaching and supervision of art in the public schools; laboratory experiences in a variety of media; observations, readings, discussions and lectures.

BIOLOGY

Arthur Hicks, Chairperson
Office: 102 Barnes Hall

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree of Master of Science in Education with concentration in Biology must hold or be qualified to hold a class A teaching certificate in Biology.

Requirements for a Degree

Non-thesis Option: 30 s.h. required.

In addition to courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following courses or their equivalent:

1. Biology 661, 662, 663, 700, 765, and 766 (or 760-761).
2. 6 s.h. of electives in education, biology, or subject related to biology.

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following courses or their equivalent:

1. Biology 661, 662, 663, 700, 765, and 862 or 863.
2. 3 hours of electives in education, biology, or related fields.
3. Thesis.

For Advanced Undergraduates and Graduates

GENERAL SCIENCE

221-600. General Science for Elementary School Teachers
(Formerly Gen. Sci. 1570)

Credit 3(3-0)

This course will consider some of the fundamental principles of the life and physical sciences in an integrated manner in the light of present society needs.

BOTANY

221-640. Plant Biology Credit 3(2-2)
(Formerly Bot. 1572)

A presentation of fundamental botanical concepts to broaden the background of high school biology teachers. Bacteria, fungi, and other microscopic plants will be considered as well as certain higher forms of plants. The course will consist of lectures, laboratory projects, and field trips.

221-642. Special Problems in Botany Credit 3(2-2)
(Formerly Bot. 1573)

Open to advanced students in botany for investigation of specific problems. Prerequisite: Biology 140 or 640.

ZOOLOGY

221-659. Foundational Radiobiology Credit 3(1-4)

A study of the fundamental concepts, procedures and applications of the principles which underlie atomic radiation and methods employed in its detection and measurement. Prerequisites: a minimum of 1 year of Physics, 2 years of Chemistry, Bio. 260, Bio. 465.

221-660. Special Problems in Zoology Credit 3(2-2)
(Formerly Biol. 1574)

Open to students qualified to do research in zoology.

221-661. Mammalian Biology Credit 3(3-0)

Study of the evolutionary history, classification, adaptation and variation of representative mammals with special emphasis on the prenatal variations in prototherian, metatherian and eutherian types. Prerequisites: 140 and 160.

221-662. Biology of Sex Credit 3(3-0)
(Formerly Biol. 1576)

Lectures on the origin and development of the germ cells and reproductive systems in selected animal forms. Prerequisite: Zoology 160 or equivalent.

221-663. Cytology Credit 3(3-0)
(Formerly Biol. 1577)

Study of the cell with lectures and periodic student reports on modern advances in cellular biology. Prerequisite: Zoology 465 or special consent of instructor.

221-664. Histo-Chemical Technique Credit 3(1-4)
(Formerly Biol. 1578)

Designed to develop skills in the preparation of cells, tissues and organs for microscopic observation and study. Prerequisite: Zoology 160.

221-665. Nature Study Credit 3(3-0)
(Formerly Biol. 1579)

A study of diversified organisms, their habits, life histories, defenses, sex relationships, period activities, and economic values; designed to acquaint the student with fundamental knowledge that should lead to a fuller appreciation of nature.

221-666. Experimental Embryology
(Formerly Biol. 1580)

Credit 3(1-4)

A comprehensive lecture-seminar course covering the more recent literature on experimental embryology and developmental physiology. Experimental studies treating amphibian, chick and rodent development are designed as laboratory projects. Prerequisite: Biol. 561 or equivalent.

221-667. Animal Biology
(Formerly Biol. 1581)

Credit 3(2-2)

A lecture-laboratory course stressing fundamental concepts and principles of biology with the aim of strengthening the background of high school teachers. Emphasis is placed on the principles of animal origin, structure, function, development, and ecological relationships.

221-668. Animal Behavior

Credit 3(3-0)

Principles of animal behavior, structure, evolution, development and regulation of behavior; social and ecological context; sensory and neural basis. A study of the qualitative and quantitative differences between behavioral characteristics at different evolutionary levels, adaptiveness of differences in behavior and the development of behavior will be emphasized. Prerequisites: Biology 260, 466 and 561.

221-669. Recent Advances in Cell Biology

Credit 3(3-0)

A course especially designed to meet the needs of advanced undergraduate students and others desirous of the more recent trends and advanced detailed knowledge concerning functions of organized cellular and sub-cellular systems. Current research as it relates to the molecular and fine structure bases of cell function, replication, and differentiation will be discussed. Prerequisites: Biology 466, 562, credit or concurrent registration in Chemistry 224.

BOTANY

221-739. Radio-isotope Techniques and Radiotracer Methods

Credit 4(2-4)

The techniques employed in the handling and measurement of radio-isotopes and their use as tracer agents in biological investigations.

221-740. Essentials of Plant Anatomy
(Formerly Botany 1585)

Credit 3(2-2)

A study of the growth, development and organization of roots, stems, leaves, and reproductive organs of higher plants. Lectures, discussions, field trips, and the laboratories are employed in the presentation of this course.

221-741. Applied Plant Ecology
(Formerly Botany 1586)

Credit 3(2-2)

A study of the relations of plants to their environment with emphasis on climate and soil factors influencing their structure, behavior and distribution. Prerequisite: Biology 640, 740 or equivalent.

221-742. Physiology of Vascular Plants
(Formerly 1587)

Credit 3(2-2)

Selected topics on the physiology of higher plants. Relationships of light quality, intensity, and periodicity to plant growth and reproduction: photosynthesis, and photoperiodism. Chemical control of growth and reproduction, and the general aspect of plant metabolism. Lectures, conferences, laboratory work and field studies of higher plant ecology.

- 221-743. Development Plant Morphology** Credit 3(2-2)
(Formerly 5586)

Growth and differentiation from a cellular viewpoint, with emphasis on quantitative description and experimental study of development phenomena.

- 221-744. Plant Nutrition** Credit 3(2-2)
(Formerly 5587)

A study of the subcellular organization of plants, inorganic and organic metabolism and respiration.

ZOOLOGY

- 221-762. Applied Invertebrate Zoology** Credit 3(2-2)
(Formerly Zoology 1590)

A study of the lower groups of animals, especially insects, and their economic importance to the southeastern region. Lectures, field trips, and experimental work with local animals are stressed, as well as factors affecting growth, development and behavior. Prerequisite: Biology 667 or equivalent.

- 221-763. Fundamentals of Vertebrate Morphology** Credit 3(2-2)
(Formerly Zoology 1591)

A study of the morphological evolution of the chordate animals from a comparative aspect, with lecture-demonstrations of dissected organ systems of the frog and cat. Reference to man is made to give this course a human approach. Prerequisite: Biology 667 or equivalent.

- 221-764. Basic Protozoology** Credit 3(2-2)
(Formerly Zoology 1592)

A study of the biology of free-living and parasitic protozoa with special emphasis on structure, behavior, life histories, and classification. Special attention will be given to free-living forms from such local animals as fish, frogs, and wild rodents. Prerequisite: Biology 667.

- 221-765. Introductory Experimental Zoology** Credit 3(2-2)
(Formerly Zoology 1593)

Studies of fertilization, breeding habits, regeneration, growth and differentiation of certain invertebrates and vertebrates from the experimental approach. Emphasis will be placed on laboratory procedures on the frog and the chick.

- 221-766. Invertebrate Biology for Elementary and Secondary School Teachers** Credit 3(3-0)
(Formerly Zoology 1594)

A study of representative invertebrate groups with emphasis on origin, structure, function, classification, and ecological relationships.

- 221-767. Genetics and Inheritance for the Secondary School Teacher** Credit 3(2-2)

A study of mendelian and molecular genetics with emphasis on organic evolution, linkage, mutation of genes and of chromosomes, population mechanics and the relation between genes and environment in development. Laboratory experiments with drosophila and maize.

- 221-768. Functional Invertebrate Zoology** Credit 3(1-4)
(Formerly 1596)

Special topics in Invertebrate Zoology to be selected for detailed study with laboratory observations made on certain forms.

221-769. Cellular Physiology Credit 4(2-4)
(Formerly 1598)

The physio-chemical aspect of protoplasm including permeability of surface tension, cellular metabolism, and other measurable properties of living cells.

221-860. Parasitology Credit 3(2-2)
(Formerly 5585)

The study of the theoretical and practical aspects of parasitism, taxonomy, physiology and immunology of animal parasites.

221-861. Advanced Genetics Credit 3(2-2)
(Formerly 5588)

The effects of chemical agents in the environment upon inheritance. Reports from the literature chiefly upon chemical mutations. Laboratory experiments on the chemical induction of crossing over.

221-862. Research in Botany 3 Credit Hours
(Formerly 5592)

221-863. Research in Zoology 3 Credit Hours
(Formerly 5593)

BIOLOGY

221-700. Environmental Biology Credit 3(2-2)
(Formerly 5589)

Problems, concepts and interpretations of relations between organisms and the environment; an analysis of environmental factors on growth, reproduction, distribution, and competition between organisms.

221-701. Biological Seminar Credit 1(1-0)
(Formerly 5590)

The presentation and defense of original research, consideration of special topics in biology and current literature.

221-702. Biological Seminar Credit 1(1-0)
(Formerly 5591)

A continuation of Biology 701.

221-703. Experimental Methods in Biology Credit 3(1-4)
(Formerly 1597)

Laboratory techniques for androgenesis, parabiosis, parthenogenesis, transplantations, grafting and other experimental techniques for recent biological research.

221-704. Seminar in Biology Credit 3(2-2)
(Formerly 1599)

Lectures, reports and laboratory procedures will be presented by student participants, staff and guest lectures on modern techniques and recent developments of selected biological problems. The nature and scope of the problem and the methods employed to study them will be varied to suit the needs and background of the student.

221-760. Projects in Biology

Credit 3(2-2)

Special projects in biology that relate to biological instruction or research in the students' area of concentration.

221-761. Seminar in Biology

Credit 1(1-0)

A seminar on selected topics and recent advances in the field of plant and animal biology.

CHEMISTRY**William B. DeLauder, Chairman****Office: Hines 116****MASTER OF SCIENCE DEGREE IN CHEMISTRY**

The Department of Chemistry offers the Master of Science degree in Chemistry. In addition to this program, the department provides instruction for those graduate students who wish to pursue a curriculum that can lead to a degree in Education with specialization in Chemistry. Individuals who desire to renew teaching certificates in the field may also enroll in certain courses in the department for this purpose.

Requirements for Admission to a Degree Program

1. Baccalaureate degree from an accredited undergraduate institution.
2. Undergraduate major in Chemistry including one year of undergraduate Physical Chemistry and one year of Integral and Differential Calculus.

The Department of Chemistry in its graduate division:

1. Provides a program of study that leads either to the M.S. degree in Chemistry or the M.S. degree in Education with concentration in Chemistry.
2. Provides formal instruction in-depth in several areas of Chemistry (Inorganic, Organic, Physical and Biochemistry).
3. Provides the opportunity for the development of creativity in special problems and research activities.
4. Provides an opportunity for students to progress toward academic maturity by engaging in group discussions, developing and presenting seminar topics, writing up research findings, and by presenting an approved thesis to the Graduate School (the latter is required of all candidates for the M.S. degree in Chemistry).

Master of Science in Chemistry

Requirements for admission to candidacy and for the degree are listed earlier in this catalogue in the description of the degree programs.

"Rising juniors, who qualify for the Graduate Program, should refer to the Undergraduate Bulletin for further information."

**MASTER OF SCIENCE IN EDUCATION
WITH CONCENTRATION IN CHEMISTRY****Academic-year Program (intended for students enrolled for a year of residence) Requirements for Admission to a Degree Program**

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the degree of Master of Science in Education with concentration in Chemistry must hold or be qualified to hold a class A teaching certificate in Chemistry and must have completed,

on the undergraduate level, a course in Physical Chemistry and a course in Integral and Differential Calculus (or the equivalent).

Requirements for a Degree

Non-thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, the student must complete the following:

1. Chemistry 611, 722, 743, 732, and 701.
2. 5 additional s.h. in Chemistry, including a special problems course in Inorganic, Analytical, Organic, or Physical Chemistry.
3. 2 hours of electives.

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, the student must complete the following:

1. Chemistry 611, 722, 743, 732, and 701.
2. A thesis in Chemistry or Education.
3. 4 hours of electives.

For Advanced Undergraduates and Graduates

223-610. Inorganic Synthesis Credit 2(1-3)
(Formerly Chem. 1670)

Discussion of theoretical principles of synthesis and development of manipulative skills in the synthesis of inorganic substances. Prerequisites: Chemistry 224, 431 and 432.

223-611. Advanced Inorganic Chemistry Credit 4(4-0)
(Formerly Chem. 1671)

A course in the theoretical approach to the systematization of Inorganic Chemistry. Prerequisites: Chemistry 441, 442 concurrent.

223-621. Intermediate Organic Chemistry Credit 3(3-0)
(Formerly Chem. 501)

An indepth examination of various organic mechanisms, reactions, structures, and kinetics. Prerequisite: Chemistry 222.

223-624. Qualitative Organic Chemistry Credit 5(3-6)
(Formerly Chem. 1776)

A course in the systematic identification of organic compounds. Prerequisite: Chemistry 224.

223-631. Electroanalytical Chemistry Credit 3(3-0)
(Formerly Chem. 1781)

A study of the theory and practice of polarography, Chronopotentiometry, potential sweep chronoampereometry and electrodeposition. The theory of diffusion and electrode kinetics will also be discussed along with the factors which influence rate processes, the double layer, adsorption and catalytic reactions. Prerequisite: Chemistry 431.

223-641. Radiochemistry Credit 3(3-0)
(Formerly Chem. 1782)

A study of the fundamental concepts, processes, and applications of nuclear chemistry, including natural and artificial radioactivity, sources and chemistry of the

radioelements. Open to advanced majors and others with sufficient background in Chemistry and Physics. Prerequisite: Chemistry 442 or Physics 406.

223-642. Radioisotope Techniques and Applications Credit 2(1-3)
(Formerly Chem. 1783)

The techniques of measuring and handling radioisotopes and their use in Chemistry, Biology, and other fields. Open to majors and non-majors. Prerequisites: Chemistry 102, Chemistry 222.

223-643. Introduction to Quantum Mechanics Credit 4(4-0)

Non-relativistic wave mechanics and its application to simple systems by means of the operator formulation. Prerequisites: Math 222, Physics 222, and Chemistry 442 prior or concurrent.

223-651. General Biochemistry Credit 5(3-6)

A study of modern Biochemistry. The course emphasizes chemical kinetics and energetics associated with biological reactions and includes a study of carbohydrates, lipids, proteins, vitamins, nucleic acids, hormones, photosynthesis, and respiration. Prerequisites: Chemistry 431 and 442.

For Graduate Students Only

INORGANIC CHEMISTRY

223-711. Structural Inorganic Chemistry Credit 2(2-0)
(Formerly Chem. 1785)

A study of the stereochemistry of inorganic substances; the relationship of structure to properties; and a discussion of experimental methods. Prerequisites: Chem. 611 and 643.

223-716. Selected Topics in Inorganic Chemistry Credit 2(2-0)
(Formerly Chem. 1686)

A lecture course on advanced topics of Inorganic Chemistry. Prerequisite: Chemistry 611 or permission of the instructor.

ORGANIC CHEMISTRY

223-721. Elements of Organic Chemistry Credit 3(2-3)
(Formerly Chem. 1690)

A systematic study of the classes of aliphatic and aromatic compounds and individual examples of each. Structure, nomenclature, synthesis, and characteristic reactions will be considered. Illustration of the familiarity of organic substances in everyday life will be included. In the laboratory, preparation and characterization reactions will be performed.

223-722. Advanced Organic Chemistry Credit 4(4-0)
(Formerly Chem. 1691)

Recent developments in the areas of structural theory, stereochemistry, molecular rearrangement and mechanism of reactions of selected classes of organic compounds. Prerequisite: One year of Organic Chemistry or Chemistry 721.

223-723. Organic Chemistry Credit 2(2-0)
(Formerly Chem. 1692)

An advanced treatment of organic reactions designed to give the student a working knowledge of the scope and limitations of the important synthetic methods of Organic Chemistry. Prerequisite: Chemistry 722.

223-726. Selected Topics in Organic Chemistry Credit 2(2-0)
(Formerly Chem. 1693)

A lecture course on advanced topics in Organic Chemistry.

223-727. Organic Preparations Credit 1-2 (0-2 to 4)
(Formerly Chem. 1694)

An advanced laboratory course. Emphasis is placed on the preparation and purification of more complex organic compounds. Prerequisite: One year of Organic Chemistry.

BIOCHEMISTRY

223-756. Selected Topics in Biochemistry Credit 2(2-0)
(Formerly Chem. 1695)

A lecture course on advanced topics in Biochemistry.

ANALYTICAL CHEMISTRY

223-731. Modern Analytical Chemistry Credit 3(2-3)
(Formerly Chem. 1787)

The theoretical bases of Analytical Chemistry are presented in detail. In the laboratory, these principles together with a knowledge of chemical properties are used to identify substances and estimate quantities in unknown samples.

223-732. Advanced Analytical Chemistry Credit 4(4-0)
(Formerly Chem. 1788)

A lecture course in which the theoretical bases of Analytical Chemistry and their application in analysis will be reviewed with greater depth than is possible in the customary undergraduate courses. Equilibrium processes, including proton and electron transfer reactions and matter-energy interactions, will be considered. Prerequisite: One year of Analytical Chemistry or Chemistry 731.

223-736. Selected Topics in Analytical Chemistry Credit 2(2-0)
(Formerly Chem. 1786)

A lecture course on advanced topics in Analytical Chemistry.

PHYSICAL CHEMISTRY

223-741. Principles of Physical Chemistry I Credit 4(3-3)
(Formerly Chem. 1789)

A review of the fundamental principles of Physical Chemistry, including the derivation of the more important equations and their application to the solution of problems. Prerequisite: Mathematics 606 or 222.

223-742. Principles of Physical Chemistry II Credit 4(3-3)
(Formerly Chem. 1790)

A continuation of Chem. 741. May be taken concurrently with Chem. 741.

223-743. Chemical Thermodynamics Credit 4(4-0)
(Formerly Chem. 1791)

An advanced course in which the laws of thermodynamics will be considered in their application to chemical processes. Prerequisite: Chemistry 442 or 742.

223-744. Chemical Spectroscopy Credit 3(2-3)
(Formerly Chem. 1792)

An advanced course in which the principles and applications of spectroscopy will be considered. Prerequisite: Chemistry 442 or 742.

223-746. Selected Topics in Physical Chemistry Credit 2(2-0)
(Formerly Chem 1795)

A lecture course on advanced topics in Physical Chemistry. Prerequisite: Chemistry 442 or 742.

223-748. Colloid Chemistry Credit 2(2-0)
(Formerly Chem. 1794)

A study of the types of colloidal systems and the fundamental principles governing their preparation and behavior. Prerequisite: Chemistry 442 or 742.

223-749. Chemical Kinetics Credit 4(4-0)
(Formerly Chem. 1793)

A study of the theory of rate processes; application to the study of reaction mechanisms. Prerequisites: Mathematics 222 and Chemistry 442 or 742.

RESEARCH AND SPECIAL PROBLEMS

223-701. Seminar Credit 1(1-0)
(Formerly Chem. 1098)

Presentation and discussion of library or laboratory research problems.

223-702. Chemical Research Credit 2-5 (0-6 to 15)
(Formerly Chem. 1085, 1806 and 1087)

A course designed to permit qualified students to do original research in chemistry under the supervision of a senior staff member. May be taken for credit more than once.

223-715. Special Problems in Inorganic Chemistry Credit 2-4 (0-6 to 12)
(Formerly Chem. 1088 and 1089)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Inorganic Chemistry. May be taken for credit more than once.

223-725. Special Problems in Organic Chemistry Credit 2-4 (0-6 to 12)
(Formerly Chem. 1090 and 1091)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Organic Chemistry. May be taken for credit more than once.

223-735. Special Problems in Analytical Chemistry Credit 2-4 (0-6 to 12)
(Formerly Chem. 1092 and 1093)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Analytical Chemistry. May be taken for credit more than once.

223-745. Special Problems in Physical Chemistry Credit 2-4 (0-6 to 12)
(Formerly Chem. 1094 and 1095)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Physical Chemistry. May be taken for credit more than once.

223-755. Special Problems in Biochemistry Credit 2-4 (0-6 to 12)

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Biochemistry. May be taken for credit more than once.

Chemistry 763. Selected Topics In Chemistry Instruction I Credit 6(6-0)

A study of the curriculum and educational materials developed for use in the Thirteen College Curriculum Program in Physical Science.

Chemistry 764. Selected Topics In Chemistry Instruction II Credit 6(6-0)

A continuation of Chemistry 763.

Chemistry 765. Special Problems In Chemistry Instruction I Credit 3(3-0)

A course designed to introduce students to techniques of Chemistry instruction at the college level.

Chemistry 766. Special Problems In Chemistry Instruction II Credit 3(3-0)

A continuation of Chemistry 765.

Chemistry 767. Special Problems In Chemistry Instruction III Credit 3(3-0)

Continuation of Chemistry 766.

Chemistry 768. Special Problems In Chemistry IV Credit 3(3-0)

Continuation of Chemistry 767.

THESIS RESEARCH

223-799. Thesis Research Credit 3 Sem. Hrs.
(Formerly Chem. 1799)

ECONOMICS

Sidney H. Evans, Chairperson
Office: 325 Merrick

ECONOMICS

Courses Offered to Advanced Undergraduates & Graduates

531-601. Economic Understanding Credit 3(3-0)

An analysis of the institutional organization and functions of the American Economy. Special references will be made to the state of North Carolina. A prerequisite for all graduate students who had no undergraduate courses in Economics and wish to take the graduate courses in economics. No credit toward a degree in Economics.

531-602. Manpower Problems and Prospects Credit 3(3-0)

An analysis of manpower development problems and prospects, with particular reference to the problems of unemployment, underemployment and discrimination. The course will focus on problem measurement, evaluation of existing policy and prospect of achievement of full human resource development. The course will invite an interdisciplinary participation on the part of the students and faculty. Prerequisites: Econ. 301 or 302; Econ. 305 or equivalent or consent of instructor.

531-603. Manpower Planning Credit 3(3-0)

Manpower planning centers chiefly on the adjustment necessary to adapt labor resources to changing job requirements. This course is designed to prepare students to create plans which will facilitate this adjustment. This course will attempt to acquaint

the student with labor force and labor market behavior such that he is able to make planning decisions relating to job creation (increasing demand) and education and training (increasing supply). Planning will be done at both the national (macro) and local (micro) levels with special emphasis on the latter. We will further attempt to evaluate all planning decisions by use of Cost-Benefit Analysis and/or Multivariate Analysis. Prerequisite: Econ. 301 or 302; Econ. 305 or equivalent or consent of instructor.

531-604. Economic Evaluation Methods

Credit 3(3-0)

This course will cover needed tools of research design, statistical reporting, cost/benefit analysis and other related techniques for internal and external evaluations of human resource development programs. This course is designed both for in-service personnel currently employed by agencies, and for the regular student enrolled in a degree-granting program.

531-610. Consumer Economics

Credit 3(3-0)

This course is designed to acquaint the student with the nature, scope and tools of Consumer economics. It is particularly oriented to minority groups, thus focusing on the economic choices currently affecting groups with rising incomes and aspirations. The course will consider the economic choices faced by consumers in maximizing satisfaction with limited means.

531-615. Economic Political and Social Aspects of the Black Experience

Credit 3(3-0)

A study of the political, economic and social tools of current public policy treating the subject of race in America. The course will examine the economic and social conditions of income inequality and explore the national commitment equal opportunity. Special emphasis will be placed on illustrations from North Carolina and adjacent states.

Courses Offered to Graduate Students

531-701. Labor and Industrial Relations

Credit 3(3-0)

Two important sectors of the economy are examined—labor and management. Historical, public and governmental influences are studied.

531-705. Government Economic Problems

Credit 3(3-0)

This course will consider the growth of public expenditures and revenues, and debts of the United States; theories of taxation and tax incidence; and the effect of public expenditures and taxes on economic growth.

531-710. Economic Development and Resource Use

Credit 3(3-0)

This course deals with resource and economic development in the domestic economy and also a comparison drawn among developed, developing and undeveloped societies.

531-720. Development of Economic Systems

Credit 3(3-0)

An analytical approach to the study of various economic systems, how these systems developed and how they are organized to carry on economic activity.

AGRICULTURAL ECONOMICS

Courses Offered to Advanced Undergraduates and Graduates

150-602. Leadership and Organization

Credit 3(3-0)

This course is designed to review the theories and techniques of leadership and the

methods of training for leadership in rural and urban communities; to examine the methodology of the economic, political, and social decisions at the local community level; and to study the techniques of community organization and community development as tools for community problem solving. This course will also increase the student's knowledge and skills for more effective leadership role performance, and leadership development in a number of varied situations in the local community.

**150-630. Southern Resources in a Changing Economy—
A Seminar**

Credit 3(3-0)

Trends and the formulation of economic and social problems in the South and particularly in North Carolina; labor and capital mobility, agricultural as compared with the industrial, the problem of underemployment, and important phases of current economic development. Prerequisites: Econ. 301, Sociology 203 or Ag. Econ. 330.

150-632. Agri-Business Policy

Credit 3(3-0)

The pace of Agri-business in the National and International economy; the impact of public policy on the industry. An analysis of policy as it relates to price support programs, finance, trade and resources development. Prerequisite: Ag. Econ. 330.

150-634. Commodity Marketing Problems

Credit 3(3-0)

Economic problems arising out of the demand, supply and distribution of specific agricultural commodities; the price making mechanism, marketing methods, grades, values, price, cost, and governmental policy. Not more than two commodities will be studied in any one semester. Selection of commodities and emphasis on problem areas will be made on the basis of current need; commodities studied will be cotton, tobacco, fruits and vegetables, and grains. Prerequisite: Consent of the Department Chairman.

150-636. Seminar in Marketing Farm Products

Credit 3(3-0)

Discussion, reports, consultation and research efforts which throw light on marketing problems of low income farmers in North Carolina, including National and International importance of locally grown products such as tobacco and cotton. Prerequisite: Consent of Department Chairman.

150-638. Special Problems in Agricultural Economics

Credit 3(1-2)

Designed for students who desire to work out special problems in the field of agricultural economics; problem definition, formulation and investigation. Prerequisite: Consent of the Department Chairman.

150-640. Agri-Business Management

Credit 3(2-2)

Methods of research, plans, organization, and the application of management principles. Part of the student's time will be spent on consultation with Agri-business firms. Prerequisite: Consent of the Department Chairman.

150-642. Seminar in Agricultural Economics

Credit 2(2-0)

Discussion reports and an appraisal of current literature on agricultural problems. Prerequisite: Consent of the Department Chairman.

150-644. Statistical Methods in Agricultural Economics I

Credit 3(2-2)

Statistical methods with special applications to agricultural problems. The statistical table, ratios, percentages, bar charts, line charts, and frequency distribution are used as analytical tools. Prerequisites: Ag. Econ. 300, Econ. 301, or Sociology 203.

150-646. Statistical Methods in Agricultural Economics II

Credit 3(2-2)

Statistical methods with special applications to agricultural problems. The time

series analysis, sampling theory, analysis of variance, and simple correlation are used as analytical tools. This course is a continuation of Ag. Econ. 644.

150-648. Appraisal and Finance of Agri-Business Firms Credit 3(3-0)

Principles of land evaluation, appraisal and taxation. The role of credit in a money economy, classification of credit, principles underlying the economic use of credit. The role of the government in the field of credit.

DEPARTMENT OF EDUCATIONAL MEDIA

Ralph L. Wooden, Chairman

Office: 101 Crosby Hall

Requirements for a Degree

Non-Thesis Option: 30 semester hours required.

In addition to courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following courses or their equivalent:

1. Media Education 602, 603 and 604 and he/she must elect at least nine semester hours from the following: Media Education 600, 601, 606 and/or 607.
2. A course in seminar or internship relevant to the specialty is required

Thesis Option: 30 semester hours required.

In addition to the courses specified in the description of general requirements for the Master of Science in Education, the student must complete the following courses or their equivalent:

1. Media Education 602, 603, and 604 and he/she must elect at least nine semester hours from the following: Media Education 600, 601, 606 and 607
2. Cognate courses—3 semester hours
3. Thesis—3 semester hours

For Advanced Undergraduates and Graduates

350-600. Classification of Media Collections Credit 3(3-0)
(Formerly 310-611)

Basic course in techniques of book and non-book description, their organization for services in libraries through decimal classification and their subject representation in the public catalog. Practice in laboratory.

350-601. Reference Materials Credit 3(3-0)
(Formerly 310-624)

The selection, evaluation, and use of basic reference materials with emphasis on the selection of materials, study of contents, methods of location, and practical application.

350-602. Utilization of Educational Media Credit 3(2-2)
(Formerly 310-644)

Applies basic concept to problems in teaching and learning with school and adult audiences. Relates philosophical and psychological bases of communications to teaching. Discusses the role of communications in problem-solving, attitude formation, and teaching. Methods of selecting and using educational media materials effectively in teaching. Experience in operating equipment, basic techniques in media preparation. Practice in planning and presenting a session.

350-603. Production of Instructional Materials Credit 3(2-2)
(Formerly 310-642)

The planning, designing, and production of opaque materials, charts, graphs, posters, transparencies, mounting, bulletin boards, displays, models, mock-ups, specimens, chalkboards, scriptwriting, and recording techniques.

350-604. Educational Media Administration Credit 3(3-0)
(Formerly 310-642)

Planning, organizing, coordinating and administering educational media programs. Developing criteria for selection, utilization care, and evaluation of the effectiveness of materials and equipment. Scientific arrangement of learning environments, space and space relations. The planning of facilities and budgeting for program and public relations activities.

350-605. Systems Approach and Curricular Integration Credit 3(3-0)
(Formerly 310-645)

Analysis of subject content, learners, specifications, and evaluation of objectives, analysis and sequencing of tasks, design of stimulus materials, selecting and evaluating of materials. Planning instructional units.

350-606. Book Selection and Related Materials for Children Credit 3(3-0)
(Formerly 310-650)

A study of children's literature with emphasis on aids and criteria for selection of books and other materials for preschool through late childhood ages, story-telling, and an investigation of reading interests.

350-607. Book Selection and Related Materials for Young People Credit 3(3-0)
(Formerly 310-651)

A consideration of literature, reading interests, and non-book materials for young people.

350-608. Programming for Instructional Radio and Television Credit 3(3-0)

Provides the student with the historical background of radio and television, principles and skills in utilizing the theory, language, signs and symbols, of radio and television. Emphasis will be focused on cooperative team teaching approach, experimentation, and innovation as strategies for programming instruction.

305-609. Production for Instructional Radio and Television Credit 3(1-4)

Affords opportunities for the student to develop and utilize knowledge and skills in designing settings, lighting techniques, operation of controls, directing, camera operation and care, producing and caring for visuals, video tapes, audio tapes, duplication of tapes, rear screen projections and sound effects, background music, also producing multi-media mis programs for various situations such as: slide-tape, or multi-image programs through film, slide, and opaque chain. Special provisions for training in preventive maintenance and minor repairs of equipment will be provided.

350-610. Broadcasting for Instructional Radio and Television Credit 3(3-0)

Prevents and evaluates live broadcast programs for instruction within the framework of acceptable criteria supported by the profession. Presenting and evaluating the effectiveness of videotaped or video disc recorded programs as used for instructional situations. To develop guidelines for quality radio and television programs.

350-700. Program Instruction
(Formerly 310-734)

Credit 3(2-2)

Theory, principles, application, and evaluation of programmed instruction techniques, survey of programmed techniques, the selection, utilization, and evaluation of existing programs. Survey of commercial programs, courses, and types of teaching machines. Practice in writing programmed instruction units.

350-701. Media Retrieval Systems
(Formerly 310-735)

Credit 3(2-2)

A survey of various media classifications, storage and retrieval models as applied to information centers and their operation. Compares traditional models with the logic of manual, mechanical, and electronic retrieval systems. Writing models for independent study.

350-702. Workshop in Educational Media
(Formerly 310-736)

Credit 3(3-0)

An exploration of recent materials, methods, and techniques and the development of skills and competencies in audiovisual communications. Demonstrations and presentations by specialists, audiovisual representatives.

350-703. Educational Media Internship and Seminar
(Formerly 310-738)

Credit 3(1-4)

This is a professional laboratory designed to provide the student with on-the-job training and direct experiences relating to his "needs" and interest in operating, organizing, and administering a well-rounded Media Education program. This course will afford students with the opportunity and experience to work in a relevant and practical situation that will deepen his understandings, broaden his perspective, gain keener insights, and increase his skills and abilities to organize instructional materials, equipment and work with people.

During a period of at least six (6) weeks, it is desired that the student will have specific duties and responsibilities for observing, studying, and working in the audiovisual media program pertaining to (1) architectural features, (2) program development, (3) cataloging, filing, and record keeping, (4) organizational patterns, (5) personnel selection and staffing, (6) administration forms, procedures, and policies, materials, and equipment, (7) public relations, budgeting considerations, (8) in-service education, (9) program evaluation, (10) research and other concomitants, such as attending and conducting professional meetings and leadership conferences and seminars.

The coordinator of the Media Education Internship Program in consultation with the student will arrange for his suitable placement under the guidance and supervision of an official of the placement facility whether it be a public school system, industry, business, governmental agency, religious organization, or otherwise. During his internship, the coordinator will visit, observe and confer with the student and his immediate supervisor. This will help to insure that the students' growth and development are being given primary concern, and to serve as feedback for assessing and evaluating his program of study at the University. The student will be required to present a written project describing his internship training and experiences.

350-704. Advanced Reference and Bibliography

Credit 3(3-0)

Special reference problems, methods and materials for school libraries, includes cooperative aspects of librarianship and the development of bibliographies.

350-705. Principles and Problems in Cataloging and Classification

Credit 3(3-0)

Methods of obtaining and organizing materials for effective use in school libraries. A study of descriptive and subject cataloging and handling of audiovisual materials.

350-706. Media in Special Education and Reading Credit 3(3-0)

This course is designed to provide personnel in special education reading programs with experiences that will enable them to develop competencies and skills in the operation, care, and utilization and production of instructional materials and equipment pertinent to the achievement of their instructional objectives.

350-707. Professional Development of Media Personnel Credit 3(3-0)

This course is designed to provide for the promotion, stimulation and professional development of educational media personnel. By conducting research projects, contributing to professional publications, and serving on professional committees as active participants.

350-715. Advanced Production in Instructional Radio and Television Credit 3(0-6)

An indepth study of advanced methods and techniques necessary to produce quality instructional radio and television programs. Experimentation, innovations, and research will be encouraged and high production standards in keeping with those of Commercial Stations. Student-produced programs may be broadcast on a cooperative basis over local radio and television facilities.

EDUCATIONAL PSYCHOLOGY AND GUIDANCE

Wyatt D. Kirk, Chairperson
Office: 209 Hodgkin Hall

The Department of Psychology and Guidance offers a program leading to a Master of Science in Education with concentration in Counselor Education (Guidance). Requirements for admission to the program and for the degree are listed earlier in this bulletin.

For Advanced Undergraduates and Graduates

GUIDANCE

320-600. Introduction to Guidance Credit 3(3-0)
(Formerly 2378)

A foundation course for prospective teachers, part-time or full-time counselors who plan to do further work in the field of guidance of education. Special consideration will be given to the nature, scope, and principles of guidance services. No credit toward a concentration in guidance.

PSYCHOLOGY

320-623. Personality Development Credit 3(3-0)
(Formerly 2023)

A study of the basic processes in personality development, the contents of personality, and the consequences of personality development.

320-661. Psychology of the Exceptional Child Credit 3(3-0)

An analysis of psychological factors affecting identification and development of mentally retarded children, physically handicapped children, and emotionally and socially maladjusted children.

320-662. Mental Deficiency

Credit 3(3-0)

A survey of types and characteristics of mental defectives; classification and diagnoses; criteria for institutional placement and social control of mental deficiency.

For Graduate Students Only**GUIDANCE****320-705. Guidance Practicum**

Credit 3(1-4)

(Formerly 2385)

Practice in the job of the high school counselor with students of high school age. Primary emphasis will be placed on counseling, but all phases of the work of the counselor will be covered. Students enrolled in this course should have completed major courses in their program and should have demonstrated skills in techniques, principles, and practices in the field. (Permission must be granted by Counselor-Educator.)

320-706. Organization and Administration of Guidance Services

Credit 2(2-0)

(Formerly 2386)

A study of methods by which guidance policies and services may be properly implemented through organizational framework; consequently, leads to more effective organization of current guidance programs.

320-707. Research Seminar

Credit 3(1-4)

(Formerly 2387)

Critical discussions of research projects in progress and of the related literature to such projects. An acceptable written report is required. The course recommended for guidance majors in the degree program and others seeking the School Counselor's certificate. Prerequisite: Guidance 705, prior or concurrent.

320-714. Internship in Guidance

Credit 3(1-4)

The Internship will be concerned with experiences involved in the organization and operation of the many and varied public school programs and their interaction with community agencies. An extended period of continuous full-time experience must be completed by students who have not had previous teaching experience. (Permission must be granted by Counselor-Educator.)

320-715. Measurement for Guidance

Credit 3(2-2)

(Formerly 2395)

The development of understandings and skills in collecting and interpreting data concerning the individual, and the use of such data in case studies and follow-up procedures.

320-716. Techniques of Individual Analysis

Credit 2(2-0)

(Formerly 2396)

A study of educational and vocational testing with reference to a general framework for using statistical information in several types of counseling problems. Statistics necessary for the evaluation of psychological and educational measurement will be considered. This course also includes the measurement of aptitude, including special aptitude, with reference to prediction of proficiency in various occupations and curricula.

320-717. Educational and Occupational Information

Credit 3(3-0)

(Formerly 2397)

Sources and procedures of assembling information about occupations and education; methods of using collecting information.

320-718. Introduction to Counseling
(Formerly 2398)

Credit 3(3-0)

Information regarding the background and theories of counseling. Consideration will be given to the counselor's function, counseling interview, use of records, and the school counselor's place in a total personnel program.

320-719. Case Studies in Counseling
(Formerly 2399)

Credit 2(1-2)

The development of a basic understanding of the case study technique as used in counseling. Compilation, analysis, diagnosis and treatment of theoretical and actual counseling case histories.

PSYCHOLOGY

320-726. Educational Psychology
(Formerly 2096)

Credit 3(3-0)

A study of the applications of psychological principles to educational practices.

320-727. Child Growth and Development
(Formerly 2097)

Credit 3(3-0)

A comprehensive analysis of physical, mental, emotional, and social growth and development from birth through adolescence.

ELEMENTARY EDUCATION AND READING

Marian L. Vick, Chairperson
Office: Hodgln

Advanced Undergraduate and Graduate

310-630. Foundations in Reading

Credit 3(3-0)

Basic reading course; consideration of the broad field of reading—its goals and nature; factors affecting its growth; sequential development of skills, attitudes and interests, types of reading approaches, organization and materials in teaching the fundamentals of reading.

310-635. Teaching Reading Through the Primary Years

Credit 3(3-0)

Methods, materials, and techniques used in reading instruction of pre-school through grade three. An examination of learning, the teaching of reading, and curriculum experiences and procedures for developing reading skills.

**310-636. Methods and Materials in Teaching Reading in the
Elementary School**

Credit 3(3-0)

The application of principles of learning and child development of the teaching of reading and the related language arts. Methods and approaches to the teaching of reading in the elementary school, including phonics, developmental measures, informal testing procedures, and the construction and utilization of instructional materials.

310-637. Teaching Reading in the Secondary School

Credit 3(3-0)

Nature of a developmental reading program initiating and organizing a high school reading program, the reading curriculum, including reading in the content subjects, critical reading, procedures and techniques, and corrective and remedial aspects.

310-638. Classroom Diagnosis in Reading Instruction Credit 3(3-0)

Methods, techniques and materials used in the diagnosis of reading problems in the kindergarten-primary area through the intermediate level. Attention upon the pupil and the interpretation of physiological, psychological, sociological, and educational factors affecting learning to read. Opportunity for identification analysis interpretation on, and strategies for fulfilling the reading needs of all pupils.

310-639. Reading Practicum Credit 3(0-6)

Application of methods, materials and professional practices relevant to teaching pupils. Provisions for participation in and teaching of reading. Designed to coordinate the student's background in reading, diagnosis, learning, and materials. Student teaching in a public school. Prerequisite: 12 credit hours in reading.

310-640. Reading for the Atypical Learner Credit 3(3-0)

Attention to the gifted child, the able retarded, the slow learner, the disadvantaged, and the linguistically different child. Special interest groups will be formed for investigation reports.

310-660. Introduction to Exceptional Children Credit 3(3-0)

An overview of the educational needs of exceptional or "different" children in the regular classroom situation; emphasis placed on classroom techniques known to be most helpful to children having hearing losses, speech disorders, visual problems, emotional, social handicaps and intelligence deviation, including slow-learners and gifted children. An introduction to the area of special education. Designed for classroom teachers.

310-661. Psychology of the Exceptional Child Credit 3(3-0)

An analysis of psychological factors affecting identification and development of mentally retarded children, physically handicapped children, and emotionally and socially maladjusted children.

310-664. Materials, Methods and Problems in Teaching Mentally Retarded Children Credit 3(2-2)

Basic organization of programs for the education of the mentally retarded; classification and testing of mental defectives; curriculum development and principles of teaching intellectually slow children. Attention is also given to the provision of opportunities for observing and working with children who have been classified as mentally retarded.

For Graduate Students Only

310-721. Curriculum in the Elementary School Credit 3(3-0)

Basic concepts of curriculum and curriculum development with attention to curriculum issues and to desirable instructional practices in the elementary school.

310-739. Reading in the Content Areas Credit 3(3-0)

Attention on reading, problems and procedures and materials for improving reading in the social studies, science, English, mathematics, foreign language, home economics and other fields.

310-740. Problems in the Improvement of Reading Credit 3(3-0)

Study of current problems, issues, trends and approaches in the teaching of reading including investigations of underlying principles of reading improvement; coverage of appraisal techniques, materials and procedures, innovative and corrective measures;

and application of research data and literature. Prerequisite: A previous graduate course in reading.

310-741. Advanced Diagnosis in Reading Instruction Credit 3(3-0)

The diagnosis and treatment of reading difficulties. Study and interpretation of selected tests useful in understanding and analyzing physiological, psychological, sociological and educational factors related to reading difficulties. Case studies and group diagnosis.

310-742. Organization and Administration of Reading Programs Credit 3(3-0)

Administrative acts requisite to the creation and guidance of a well-balanced, school-wide reading program. For all school personnel who are in a position to make administrative decisions regarding the school reading program.

310-743. Advanced Practicum in Reading Credit 3(0-6)

Actual experiences with youth and teachers in professional activities.

310-744. Seminar and Research in Reading Credit 3(3-0)

Evaluation of recent research concerning findings, approaches, innovations, and organization of reading instructions. Selected topics for reports and research projects. Independent study of selected topics of experimentation. Prerequisite: 24 semester credit hours in graduate courses.

310-781. Issues in Elementary Education Credit 3(3-0)

A critical review of the background and functions of the elementary school as a social institution. Attention is given to increasing the ability to formulate the generalizations of development and learning into a meaningful framework for appraising current educational thinking and practice and predicting the direction in which these must move if elementary school programs are to continue to improve.

310-783. Current Research in Elementary Education Credit 3(3-0)

A critical analysis of the current research in elementary education and the implications of such for elementary school educative experiences.

310-E785. Independent Reading in Education I Credit 1(0-2)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

310-E786. Independent Readings in Education II Credit 2(0-4)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

310-E787. Independent Readings in Education III Credit 3(0-6)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

ENGINEERING

William J. Craft, Assistant Dean, School of Engineering
W. A. Streat, Chairperson, Architectural Engineering
Winser Alexander, Chairperson, Electrical Engineering
Victor Zaloom, Chairperson, Industrial Engineering
David Klett, Chairperson, Mechanical Engineering
Office: Graham Hall

For Advanced Undergraduates and Graduates

400-602. Advanced Strength of Materials Credit 3(3-0)

Stress-strain in relations as applied to statically indeterminate structures, bending in curved bars, plates, shells, and beams on elastic foundations; strain energy concepts for formulation of flexibility matrix on finite elements; bending in beams and plates; introduction to cartesian tensor notation and matrix structural analysis. Prerequisite: 440-336 or equivalent.

400-603. Advanced Thermodynamics Credit 3(3-0)

Statistical mechanics and microscopic properties from statistical methods. Equilibrium information, generalized coordinates, and general variables. Prerequisite: 440-442 or equivalent.

400-606. Automatic Control Theory Credit 3(3-0)

The automatic control problem; review of operational calculus; state and transient solutions of feedback control systems; types of servo-mechanisms and control systems; design principles. Prerequisite: 420-400 or equivalent.

400-608. Solid State Energy Conversion Credit 3(3-0)

Review of semiconductor and solar radiation principles. Operation and design of solid state thermoelectric generators. Operation and design of solar cells. Use of solar collectors and solar cells in terrestrial applications. Prerequisites: 227-406 & 420-460 or consent of instructor.

400-610. Quantum Theory for the Solid State Credit 3(3-0)

Quantum theory of solids for research in the solid state area. Topics covered: the many-body Hamiltonian, quantum statistics, free energy, crystal binding and symmetry, Fermi and Bose Gases, lattice vibrations, electron-phonon interactions, semiconduction, superconduction, magnetic interactions, effects of crystalline imperfections on single crystal behavior. Prerequisites: 227-605.

400-612. Modulation Theory & Communication Systems Credit 3(3-0)

Fundamental principles of modulation theory applied to amplitude, single and double side band, frequency, pulse amplitude, pulse duration, pulse code and multiplexing modulation methods and their application to communication systems are studied. Random signals, noise considerations and probability theory are introduced. Prerequisites: 420-300, 420-320 & 225-500.

400-616. Physics of Solid State Devices Credit 3(3-0)

Theory of crystal growth, semiconductor behavior, and semiconductor applications. Physics and chemistry of crystal growth, phase diagrams, doping, growth related and thermally produced defects, diffusion theory, band theory, density of states, mobility, deep impurities, p-n junction theory, continuity equations, solar cells, light emitting diodes, solid state detectors. Prerequisites: 227-408 or consent of instructor.

400-618. Discrete Systems

Credit 3(3-0)

Analysis and design of discrete-time systems through time-domain and z-domain techniques; time-domain synthesis and optimal control; mathematical and physical aspects of selected classes of computer control systems; computer simulation. Prerequisites: 420-400 or consent of instructor.

400-620. Computer Software Design

Credit 3(3-0)

An introduction to structured programming techniques that lead to error-free programs. Concepts of making computers more accessible and useful. Compilers and interpreters will be reviewed as examples. Operating systems will be covered as time allows. Prerequisites: 420-460, 420-300.

400-622. Electronic Engineering

Credit 4(3-3)

A study of various types of electronic circuits used in engineering practice-wave shaping and computing circuits, photosensitive devices and circuits; control and switching circuits; modulation and demodulation circuits. Coordinated laboratory work with industrial applications and special projects. Prerequisite: 420-460 or equivalent.

400-627. Fundamentals of Digital Logic

Credit 3(3-0)

Systematic approach to design and understanding of logic circuits. A review of Boolean algebra, combinational and sequential design, and usage of common logic devices is covered. Current commercial devices are referred to as examples. Prerequisites: 420-300, 420-460.

400-628. Foundation Engineering

Credit 3(2-2)

Subsoil investigations, analysis and design of foundations and other substructures. Caisson and cofferdam design and methods of construction—ground water control. Prerequisite: 410-564 or equivalent.

400-630. Digital Signal Processing I

Credit 3(3-0)

Develop working knowledge of basic signal processing functions such as digital filtering, spectral analysis, and detection/post detection processing. Methods of generating the coefficients of the digital filters will be derived. Alternate structures for filters such as infinite impulse response and finite impulse response will be compared. The effect of finite register length will be covered. Prerequisites: 420-400 & 225-500 or consent of instructor.

400-632. Information Theory

Credit 3(3-0)

Probability theory and its application in the analysis of information transfer. Special attention is given to information in communications, random signals, noise processes, microscopic processes, and macroscopic events. Prerequisite: 420-400 or equivalent.

400-633. Digital Electronics

Credit 3(3-0)

Families of logic: Resistor-transistor logic (RTL), integrated-injection logic (IIL), Diode-transistor logic (DTL), Transistor-transistor Logic (TTL), Emitter-coupled logic (ECL), MOS gates and CMOS gates. Basic digital structures: Flip-flops. Registers and counters. Interface between digital and analog signals. Prerequisites: 420-460.

400-635. Structural Steel Design

Credit 3(3-0)

Theory and design of structural components: Tension members, compression members, beams, and connections. Theory and design of structural systems: Single and multistory frames with gravity and lateral loads, arches and composite construction. Prerequisite: 410-457.

400-636. Computer Methods in Power Systems Credit 3(3-0)

Modeling and analysis of electric power systems, system load flow analysis, optimal operation and contingency planning, transients and surge phenomena, system stability. Digital computer solutions emphasized. Prerequisites: 420-430.

400-637. Power Systems Analysis Credit 3(3-0)

Study of the dilemma facing the power industry, system model load flow problem, voltage profiles, impact of exponential growth and outages, simple fault studies, blackouts. Digital computer solution emphasized. Prerequisites: 420-430.

400-640. Advanced Engineering Economy Credit 3(3-0)

Review of traditional methods. Replacement analysis. Capital planning and budgeting. Risk and uncertainty methodologies. Decision tree analysis. Multiple criteria analysis. Prerequisites: IE 460 or consent of instructor.

400-644. Matrix Analysis of Structures Credit 3(2-2)

Lecture and Laboratory. Review of Matrix algebra; statically and kinematically, indeterminate structures; introduction of flexibility and stiffness methods; applications to beams, plane trusses and plane frames. Prerequisite: 410-457 or equivalent.

400-646. Network Synthesis Credit 3(3-0)

Use of positive real functions in the synthesis of passive networks. Investigation of the properties of the driving point and transfer functions of passive networks and synthesis of one and two port networks by positive real functions. Prerequisites: 420-300.

400-648. Numerical Analysis for Engineers Credit 3(3-0)

Scientific programming, error analysis, matrix algebra, eigenvalue problems, curve-fitting approximations, interpolation, numerical differentiation and integration, solutions to simultaneous equations, and numerical solutions of differential equations. Prerequisite: Consent of instructor.

400-650. Operations Research Credit 3(3-0)

Management decision making, queuing theory, probability and sequences, formulation of mathematical models of processes with orientation to optimizing by use of digital computers. Prerequisite: 225-224 or equivalent.

400-652. Plates and Shells Credit 4(2-4)

Lecture and Laboratory. Introduction to plane plate theory; membrane stresses in shells with axial symmetry; cylindrical shells; applications in the design of shell roofs, tanks pipelines and pressure vessels. Prerequisite: 410-455 or equivalent.

400-654. Projects in Electronic Networks and Systems Credit 3(1-6)

Special topics and laboratory work of special interest to students in electronic networks and communications circuits; most of the work is carried on by the project method and emphasizes actual circuit construction. Prerequisite: 420-300 or equivalent.

400-658. Project Management and Scheduling Credit 3(3-0)

Project scheduling with CPM and PERT. Scheduling within resource constraint. Cost scheduling. Cost estimation with emphasis on learning curves. Assembly line balancing. Introduction to theory of sequencing/scheduling with applications of priority rules and Heuristic Methods. Prerequisites: IE 320 or consent of instructor.

400-660. Selected Topics in Engineering Credit Variable (1-3)

Selected engineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled. Prerequisites: Consent of instructor.

400-662. Reliability Credit 3(3-0)

Review of probability theory; combinatorial reliability; catastrophic-failure models; system reliability; reliability improvement; statistical parameter and interval estimation for reliability functions. Prerequisites: IE 320 or consent of instructor.

400-664. Safety Engineering Credit 3(3-0)

History. Legislation. Engineering safety analysis. OSHA (i.e., Occupational Safety and Health Act). Safety program organization and Procedures. Prerequisites: Senior standing in engineering or consent of instructor.

400-666. Special Projects Credit Variable (1-3)

Study arranged on a special engineering topic of interest to student faculty member, who will act as advisor. Topics may be analytical and/or experimental and encourage independent study. Prerequisite: Consent of instructor.

400-669. A Survey of Operations Research Methodologies Credit 3(3-0)

Classical optimization. Generalized linear programming. Assignment technique. Transportation technique. Queueing. Dynamic programming. Prerequisite: Math 117 or consent of instructor.

400-670. Semiconductor Theory and Devices Credit 3(3-0)

A study of the phenomena of solid-state conduction and devices using band models; excess carrier in semiconductors; p-n junctions and devices; bipolar junction transistor; field-effect transistors; integrated circuits. Prerequisite: 227-406 and 420-460.

400-672. Theory of Elasticity Credit 3(3-0)

Introduction; stress; strain; stress-strain relations; energy principles; special topics. Prerequisites: 440-336 and 225-565 or equivalent.

400-676. Microprocessors: Theory and Practice Credit 4(3-2)

An introductory survey of the microcomputer world. Architecture of several representative types will be studied and compared. Software development systems will be reviewed. Interfacing the Microcomputer to peripheral devices will be emphasized. Students will work with actual components in the lab. Prerequisite: 400-627.

400-678. Engineering Management Credit 3(3-0)

A brief review of engineering management history and its relationship to industrial engineering, operations research, management science and technical engineering disciplines. Planning, organizing, staffing, directing and controlling in an engineering environment. Prerequisites: Senior standing in engineering or consent of instructor.

400-680. Solid State Technology Lab Techniques I Credit Variable (1-3)

Lectures and experiments in measurement of semi-conductor material properties and semi-conductor device characteristics. Mobility, resistivity, lifetime, optical absorption; semi-conductor diode I-V and C-V measurement techniques. Prerequisite: 400-670 or consent of instructor.

400-683. Probability and Random Processes Credit 3(3-0)

Sample space and events, conditional probabilities independent events, Bayes' formula, discrete random variables, continuous random variables, expectation of random variable, joint distribution, conditional expectation, Markov chains, stationary processes, ergodicity, correction and power spectrum of stationary processes. Poisson processes. Gaussian processes. Prerequisite: 420-400.

400-688. Experimental Stress Analysis Credit 3(3-0)

Principles and methods of experimental stress analysis. Photo-elastic and micro-measurement techniques applied to strain and stress investigations. Experiments using structural models. Prerequisite: 410-457 or 400-602 or equivalent.

400-700. Advanced Reinforced Concrete Design Credit 3(2-2)

Advanced theory and methods applied to the design of reinforced concrete structures, including yield line methods, ultimate strength theory and limit design. Prerequisite: 410-455 or equivalent.

400-701. Advanced Structural Analysis Credit 3(3-0)

The analysis of various types of structural problems, including the application of modern analytical methods. Prerequisite: 410-562 or equivalent.

400-703. Research Techniques in Material Science Credit Variable (1-3)

Familiarization with the tools of experimental materials science; instrumentation; vacuum technology, temperature measurement and control; characterization and analysis of materials by such techniques as electron diffraction and imaging, spectroscopy, calorimetry, and others. Prerequisite: 227-406 or consent of instructor.

400-705. Solid State Devices Credit 3(3-0)

Semiconductor heterojunctions and metal semiconductor junctions. Semiconductor heterojunction models and diode behavior. Optoelectronic and other bulk-effect semiconductor devices. Advanced treatment of bipolar transistors and field effect transistors. Prerequisite: 400-680 or consent of instructor.

400-707. Physical Tensor Properties of Crystals Credit 3(3-0)

Tensor analysis; crystal symmetry and symmetry transformations; dielectric, magnetic and elastic anisotropic properties of crystals; interaction effects and diagrams, piezoelectric and optical properties of crystals. Prerequisite: 400-680 or consent of instructor.

400-710. Boundary Layer Theory Credit 3(3-0)

A study of fluid flow with effects of viscosity analyzed as a boundary layer phenomena derivation of general equations of motion, velocity potential and stream function, perturbation theory and determination of drag and life for subsonic and supersonic flows. Prerequisite: 440-568 or equivalent.

400-712. Work Measurement Theory Credit 3(3-0)

A review of classical methods of engineering and work measurement. Critical analysis of the underlying theory. Analysis of wage incentives systems. Prerequisite: IE 410 or consent of instructor.

400-714. Industrial Simulation Credit 3(3-0)

Study of the GPSS (i.e., General Purpose Simulation System) language including a term project. Review of other simulation languages, such as: (1) Industrial Dynamics, (2) CSMP, (3) GASP and (4) SIMSCRIPT. Prerequisite: IE 210 & IE 320 or consent of instructor.

400-715. Continuum Mechanics

Credit 3(3-0)

The applications of the laws of mechanics and thermo-dynamics to the continuum: a rigorous development of the general equations applied to a continuum, the application and reduction of the general equations for specific cases of both solids and fluids. Prerequisite: 440-336 or equivalent.

400-718. Advanced Quality Control

Credit 3(3-0)

Quality control system philosophy. General theory of control charts, selection & use including advanced methods. Review of sampling distributions, analysis of acceptance sampling plans. Prerequisite: IE 510 or consent of instructor.

400-719. Design of Buildings for Extreme Wind and Earthquake Forces

Credit 3(3-0)

Principles of structural dynamics; response of buildings to earthquake induced forces; evaluation of earthquake forces using the response spectra; study of the behavior of wind, variation in wind velocity with respect to topography and height above ground; the study of the response of building components to hurricanes and tornadoes. Prerequisite: 225-300, 410-561, and 410-563 or 400-635.

400-722. Electromagnetic Wave Theory

Credit 3(3-0)

Fundamental electromagnetic concepts at ultra-high frequencies and above; analysis of transmission lines and networks; Maxwell equations and their applications; wave guides and radiating systems. Prerequisite: 420-450 or equivalent.

400-724. Theory of Linear Systems

Credit 3(3-0)

State space representation of dynamical systems. Analysis techniques for linear models in control systems, network theory, and signal processing. Continuous, discrete and sampled representations. Prerequisite: 420-400, and 400-606.

400-726. Systems Analysis and Design

Credit 3(3-0)

Analysis and development of socio-economic system theory. Case studies. System study term project. Prerequisite: Graduate standing in engineering.

400-730. Industrial Dynamics

Credit 3(3-0)

Study DYNAMO language including a term project. Analysis of classical industrial dynamics models and industrial dynamics system methodologies. Prerequisite: Graduate standing in engineering.

400-733. Operations Research II

Credit 3(3-0)

Linear approximations to non-linear programming; the Kuhn-Tucker Theory of NLP; convex programming; geometric programming; general theory of optimization. Prerequisite: 400-650.

400-735. Heat Transfer I—Conduction

Credit 3(3-0)

The development and application of the general energy equations. Heat transfer through walls, cylinders, real boundary conditions, and numerical procedures. Prerequisite: 440-562 or equivalent.

400-736. Heat Transfer II—Radiation

Credit 3(3-0)

A study of energy transfer by means of thermal radiation. Black body radiation, gray body radiation, gas radiation, and real body radiation. Prerequisite: 440-562 or equivalent.

400-738. Irreversible Thermodynamics Credit 3(3-0)

A study of processes which are inherently entropy producing. Development of general equations, theory of minimum rate of entropy production, mechanical processes, life processes, and astronomical processes. Prerequisite: 400-603 or equivalent.

400-740. Machine Tool Design Credit 3(3-0)

Basic Principles of single point and multiple point tools, materials, forces, velocities, and power requirements. Dies and punches; material and manufacture; die and assemblies design clearances; supports, stops and pilots, strippers and knockouts. General requirements of a machine tool; design principles of machine tools; stiffness and rigidity standardization of speeds and feeds; layout of speed change gears; design of some constructional elements. Prerequisite: 440-226 or equivalent.

400-742. Mechanic Properties and Theories of Failure Credit 3(3-0)

Static properties in tension and compression; stress and combined stresses; fatigue, impact, creep and temperature. Various theories of failure under the above loading conditions. Applications. Prerequisite: 440-336 or equivalent.

400-744. Network Matrices and Graphs Credit 3(3-0)

Use of vector space techniques in the description, analysis and realization of networks modeled as matrices and graphs. The course investigates vector space concepts in the modeling and study of networks. The system concept of networks is introduced and explored as a dimensional space consideration in terms of matrices and graphs. Prerequisite: 420-400 or equivalent.

400-746. Phase Equilibria Credit 3(3-0)

Interpretation and Mathematical analysis of unary, binary and ternary, inorganic, phase equilibria systems with examples for solving practical materials science problems; isoplethal and isothermal sections, and crystallization paths; thermodynamic fundamentals. Prerequisite: 227-408 or consent of instructor.

400-749. Inventory Systems Analysis and Design Credit 3(3-0)

Demand forecasting with emphasis on statistical techniques and smoothing. Inventory control system philosophy. Study of deterministic and probabilistic inventory systems. Use of lagrange multipliers, dynamic programming and queueing in inventory control. Introduction to queueing theory. Prerequisite: IE 530 or consent of instructor.

400-752. Solid State Technology Lab Techniques II Credit Variable (1-3)

Lectures and experiments in semiconductor device fabrication processes. Crystal growth, epitaxial techniques, impurity diffusion, Schottky barriers, and ohmic contacts. Diode, Transistor, integrated circuit and solar cell structures will be studied. Prerequisite: 400-680 or consent of instructor.

400-755. Plastic Analysis and Design Credit 3(3-0)

Behavior of structural steel beyond the elastic limit. Ultimate load theory, the analysis and design of steel-framed structures and components. Strength and behavior of structures stressed in the plastic range. Prerequisite: 410-457 and 410-461 or equivalent.

400-757. Physical Metallurgy of Industrial Alloys Credit 3(3-0)

Review of principles of alloying and heat treatment and their application to com-

mercially important alloy systems. Principles of corrosion. Prerequisite: 440-226 and 440-560 or equivalent.

400-759. Prestressed Concrete Theory and Design Credit 3(3-0)

Theory and methods of design for prestressed concrete structures. Material and construction techniques, ultimate-strength design. Prerequisite: 410-455 or equivalent.

400-761. Statistical Communication Theory Credit 3(3-0)

Statistical theory of signal transmission. Markov chain processes and systems, information measures, channel capacity, and coding theorems. Detection and extraction of signals in noise background based on statistical decision theory. Prerequisite: 400-612.

400-762. Advanced Thermodynamics and Mass Transport Credit 3(3-0)

Thermodynamic laws and functions and their relation to problems of materials science; diffusion theory and its application; survey of principles of phase transformations; nucleation and growth; the discussion of diffusion and phase transformations are extended and applied to real systems. Prerequisite: 227-408 or consent of instructor.

400-763. Computer-Aided Network Design Credit 3(3-0)

Common techniques used in making design or networks easier by computers. Covers user-written programs, modeling, libraries, optimization, sensitivity. Design by means of a system will be emphasized. Prerequisite: 420-400 and 400-620.

400-765. Digital Signal Processing II Credit 3(3-0)

Continuation of Digital Signal Processing I. Homomorphic filtering, simulation of dynamical systems, random functions, correlation and power spectra will also be covered. Prerequisite: 400-630 or consent of instructor.

400-767. Structural Dynamics Credit 3(3-0)

A study of structures subjected to dynamic loading. Formulation of mass-lumped and consistent, stiffness and damping matrices. Equivalent structural damping and elastic-plastic effects on response. Prerequisite: 400-644 or equivalent.

400-772. Theory and Design of Digital Systems Credit 3(3-0)

Digital system concepts of language models, algorithms, manipulative schemes, information structures, and pulse networks. Prerequisite: Consent of instructor.

400-774. Theories of Manufacturing Processes Credit 3(3-0)

Review of metal cutting and forming, material behavior characteristics related to cutting and forming. Metal cutting analysis, mechanics of chip formation, thermal aspects of cutting, prediction of tool wear and tool life. Metal forming analysis, hot-working and cold-working, upper and lower bound solutions, slip line theory, plane strain. Applications to rolling, forging, wire drawing, extrusion, deep drawing and bending. Prerequisite: 440-226 or equivalent.

400-776. Theory of Plasticity Credit 3(3-0)

Basic concepts of plastic deformation, trusses and beams; plane shear theory; axially symmetric problems; torsion, limit analysis, and extremum principles. Prerequisite: 400-762 or equivalent.

400-777. Thesis Credit Variable (1-6)

400-778. Theory of Vibrations

Credit 3(3-0)

Vibration analysis of systems with one, two, or multi-degrees of freedom. Instrumentation, continuous systems, computer techniques. Prerequisite: 440-566 or equivalent.

400-779. Advanced Structural Steel Design

Credit 3(2-2)

Modern methods and advanced theory applied to the design of steel structures. Project design includes the solution to various types of framed structures. Prerequisite: 410-457 and 410-563 or equivalent.

400-788. Research

Credit Variable (1-3)

Advanced research in an area of interest to student and instructor.

400-789. Special Topics

Credit Variable (1-3)

Study of advanced topics selected prior to the offering and pertinent to student's programs of study.

ENGLISH

Jimmy L. Williams, Chairperson
Office: 202 Crosby Hall

The Department of English offers a concentration of studies for persons seeking to improve their knowledge of English and American literature and language and for individuals seeking a Master of Arts in English and Afro American Literature and a Master of Science in Education with concentration in English.

Requirements for Admission to the Master of Arts Program in English and Afro-American Literature

All applicants to the M.A. program must have earned a bachelor's degree from a four-year college. Applicants must also have completed a minimum of twenty-four (24) undergraduate hours in English. Application forms may be obtained from the office of the Graduate School or the English Department and must be completed and returned to the Graduate Office. Two (2) official transcripts of previous undergraduate or graduate records and three (3) letters of recommendation must be forwarded to the Graduate Office before action can be taken on the application. An applicant may be admitted to the program unconditionally, provisionally, or as a special student.

Unconditional Admission. To qualify for unconditional admission to the M.A. program, an applicant must have earned an overall average of 3.00 on a four-point system (or 2.00 on a three-point system) in undergraduate studies.

Provisional Admission. An applicant may be admitted to graduate studies on a provisional basis if (1) the record of undergraduate preparation reveals deficiencies that can be removed near the beginning of graduate study or (2) lacking the required grade point average for unconditional admission, the applicant may become eligible by successfully completing the first nine (9) hours of course work with a 3.00 or better average. A student provisionally admitted may also be required to pass examinations to demonstrate his knowledge in certain areas or to take special undergraduate courses to improve his background.

Special Students. Students not seeking the M.A. degree may be admitted in order to take courses for self-improvement or for renewal of teaching certificates. If the student subsequently wishes to pursue the M.A. program, he or she must request an evaluation of the work. Under no circumstances may the student apply toward a degree program more than twelve (12) hours earned as a special student.

DEGREE REQUIREMENTS

Total Hours Required. The M.A. program consists of two distinct and parallel elements. The student may elect to take twenty-four (24) hours of course work and write a thesis for six (6) hours credit in order to satisfy the thirty-hour minimum requirement. The student may also elect not to write a thesis and take an additional six (6) hours of course work in order to satisfy the thirty-hour minimum requirement. Three courses are required: English 754—History and Structure of the English Language, English 753—Literary Research and Bibliography, and English 700—Literary Analysis and Criticism. The student must take a minimum of twelve (12) hours and no more than a maximum of fifteen (15) hours in Afro-American Literature.

Approximately fifty percent of the courses offered each semester will be open only to graduate students. These courses are on the 700 level. All 600 level courses will be open to both undergraduate and graduate students.

Grades Required. Students in the M.A. program must maintain a 3.00 average in order to satisfy the grade requirements of the program. If a student receives a C or lower in more than two (2) courses, he or she will be dropped from the program.

Amount of Credit Accepted for Transfer. The Graduate School will accept six (6) semester hours of transfer credit from another institution for those students enrolled in degree programs.

Other Requirements (Comprehensive and Thesis Examinations). Students must pass a three (3) hour written comprehensive examination administered by the English Department. The comprehensive examination will cover only material to which the student has been exposed in course work at A. and T. The comprehensive may be taken twice. Those students who elect to write a thesis must meet the deadlines projected by the Graduate School in addition to standing a one-hour oral examination which constitutes a defense of the thesis. The defense may be attempted twice.

Language and/or Research Tool Requirements. A student wishing to pursue the M.A. program must demonstrate proficiency in a foreign language by passing a one-hour written examination to be administered by the Foreign Language Department of A. and T. The Princeton Foreign Language Examination (ETS) may also be used to satisfy the language requirement. Students failing to pass the proficiency examination after two attempts must enroll in the appropriate intermediate level courses and earn a grade of at least "B". In addition to the traditional languages which satisfy the departmental requirements (e.g., French, German and Spanish), qualified students may elect to substitute a language related to Afro-American literature (e.g., Swahili). Foreign students may also elect to substitute English to meet the language requirement.

Requirements for Admission to the Master of Science Degree in Education with Concentration in English

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the Master of Science in Education with concentration in English must have earned the following in undergraduate studies: Twenty-four (24) semester hours in English courses above freshman composition. The hours must include at least three semester hours of Shakespeare, three of American literature, three of English literature, three of world literature or contemporary literature, and three of advanced grammar and composition.

A student who fails to meet these qualifications will be expected to satisfy the requirements by enrolling in undergraduate courses before beginning graduate studies in English. Except for the foreign language requirement, the admission requirements

are the same for the M.S. in Education—English as they are for the M.A. in English and Afro-American Literature.

Non-Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. English 700, 754, 770
2. 15 semester hours selected from the following: English 603, 620, 628, 702, 704, 750, 751, 752, 755

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. English 700, 754, 770
2. 12 semester hours selected from the following: 620, 628, 629, 702, 704, 720, 750, 751, 752, 755.
3. Thesis Research: 3 semester hours.

ENGLISH

Jimmy L. Williams, Chairperson
Office: 202 Crosby Hall

For Advanced Undergraduates and Graduates

212-603. Introduction to Folklore
(Formerly 2498)

Basic introduction to the study and appreciation of folklore. (Cross listed as Anthropology 603).

212-620. Elizabethan Drama Credit 3(3-0)
(Formerly English 2491)

Chief Elizabethan plays. Tracing the development of dramatic forms from early works to the close of the theaters in 1642. Prerequisite: English 220 and 221; 210.

212-621. Grammar and Composition for Teachers Credit 3(3-0)
(Formerly English 2972)

A course designed to provide a review of the fundamentals of grammar and composition for the elementary or secondary school teacher. (Not accepted for credit toward undergraduate or graduate concentration in English.)

212-626. Children's Literature Credit 3(3-0)

A study of the types of literature designed for students from kindergarten through elementary school. Prerequisites: Graduate standing or English 101, Humanities 200-201.

212-627. Literature for Adolescents Credit 3(3-0)

A course to acquaint prospective and inservice teachers with a wide variety of good literature that is of interest to adolescents. Emphasis on thematic approach to the study of literature, bibliotherapy, continental writers, book selection, and motivating students to read widely and independently with depth and understanding. Prerequisites: English 101, 200, and 201 or graduate standing.

212-628. The American Novel Credit 3(3-0)
(Formerly English 2978)

A history of the American novel from Cooper to Faulkner; Melville, Twain, Howells, James, Dreiser, Lewis, Hawthorne, Faulkner, Hemingway will be included. Prerequisite: English 210 or 700.

212-639. Media Internship Credit 6(1-0)

On-the-job training with local news gathering organization; and a critical analysis of a contemporary problem. Prerequisites: English 455 and 456 or 457.

212-640. Writing and Announcing for TV-Radio Credit 3(2-2)

Techniques and practices of editing and preparing local and wire news copy for radio and television news broadcasts; laboratory practice in preparation of same for actual broadcasting. Prerequisites: English 455 and 456 or 457.

212-641. Public Information and Public Relations Techniques Credit 3(3-0)

Publicity methods are employed by educational institutions, federal agencies and private industries; how to communicate through newspapers, magazines, radio-television stations and other media. Prerequisite: English 455 or graduate standing.

212-650. Afro-American Folklore Credit 3(3-0)

A study of folk tales, ballads, riddles, proverbs, superstitions and folk songs of black Americans. Parallels will be drawn between folklore peculiar to black Americans and that of Africa, the Carribean, and other nationalities.

212-652. Afro-American Drama Credit 3(3-0)

A detailed study of the dramatic theory and practice of black American writers against the backdrop of Continental and American trends. Special attention will be given to the works of major figures from the Harlem Renaissance to the present. Works by Bontemps, Cullen, Hughes, Hansberry, Ward, Davis, Baldwin, Baraka (Jones), Gordone, and Bullins will be included.

212-654. Afro-American Novel I Credit 3(3-0)

An intensive bibliographical, critical, and interpretative study of novels by major black writers through 1940. Novelists emphasized include Dunbar, Chesnutt, Toomer, McKay, Larsen, Hurston, Griggs, Fauset, and Wright.

212-656. Afro-American Novel II Credit 3(3-0)

An intensive bibliographical, critical, and interpretative study of novels by major black writers after 1940. Novelists emphasized include Wright, Ellison, Baldwin, Himes, Demby, Williams, Walker, Brooks, Petry, Gaines, and Mayfield.

212-658. Afro-American Poetry I Credit 3(3-0)

An intensive study of Afro-American poetry from its beginning to 1940 with special attention given to poets of the Harlem Renaissance. Poets to be studied include Terry, Hammon, Wheatley, A. A. Whitman, Horton, Braithwaite, J. W. Johnson, Horne, Fenton Johnson, Georgia Douglas Johnson, McKay, Cullen, Cuney, and Hughes.

212-660. Afro-American Poetry II Credit 3(3-0)

An intensive study of Afro-American poetry from 1940 to the present with considerable attention given to the revolutionary poets of the sixties and seventies. Poets to be studied include Hughes, Walker, F. M. Davis, Brooks, Brown, Hayden, Tolson, Lee, Reed, Giovanni, Angelou, Jeffers, Sanchez, Redmond, Fabio, Fields, and Jones.

212-662. History of American Ideas

Credit 3(3-0)

A study of major ideas which have animated American thought from the beginning to the present.

Graduate

These courses are open only to graduate students.

212-700. Literary Analysis and Criticism

Credit 3(3-0)

(Formerly 2485)

An introduction to intensive textual analysis of poetry, prose fiction, prose non-fiction, and drama. A study of basic principles and practices in literary criticism and of the various schools of criticism from Plato to Eliot.

212-702. Milton

Credit 3(3-0)

(Formerly English 2486)

A study of the works of Milton in relation to the cultural and literary trends of seventeenth-century England. Emphasis is placed upon Milton's poetry.

212-704. Eighteenth Century English Literature

Credit 3(3-0)

(Formerly English 2487)

A study of the major prose and poetry writers of the eighteenth century in relation to the cultural and literary trends. Dryden, Defoe, Swift, Fielding, Addison, Pope, Johnson, and Blake will be included.

212-710. Language Arts for Elementary Teachers

Credit 3(3-0)

(Formerly English 2488)

A course designed to provide elementary school teachers with an opportunity to discuss problems related to the language arts taught in the elementary school. (Not accepted for credit towards concentration in English.)

212-711. Language Arts for Elementary Teachers II

Credit 3(3-0)

(Formerly English 711)

A continuation of the study of relevant language situations with which elementary teachers should be concerned. Emphasis will be placed on strategies for guiding pupils to explore the nature and structure of language and for teaching essential language skills. (Not accepted for credit towards concentration in English.)

212-720. Studies in American Literature

Credit 3(3-0)

(Formerly English 2489)

A study of major American prose and poetry writers.

212-749. Romantic Prose and Poetry of England

Credit 3(3-0)

(Formerly English 2490)

A study of nineteenth-century British authors whose works reveal characteristics of Romanticism, Wordsworth, Coleridge, Shelley, Keats, Byron, Lamb, Carlyle, and De Quincey will be included.

212-750. Victorian Literature

Credit 3(3-0)

A study of nineteenth-century Victorian writing, including poetry, fiction, and non-fictional prose. Among the writers to be considered will be Tennyson, Browning, Arnold, Rossetti, Carlyle, Mill, Dickens, the Brontes, Eliot, Thackeray, and Hardy.

212-751. Modern British and Continental Fiction

Credit 3(3-0)

(Formerly English 2491)

A study of British and European novelists from 1914 until the present. Included in the study are Joyce, Kafka, Gide, Mann, and Camus.

212-752. Restoration and 18th Century Drama Credit 3(3-0)
(Formerly English 2492)

A study of the theatre and drama in relation to the cultural trends of the period. Etherege, Farquhar, Vanbrugh, Congreve, Fielding, Gay, Steele, Goldsmith, and Sheridan will be included.

212-753. Literary Research and Bibliography Credit 3(3-0)
(Formerly English 2943)

An introduction to tools and techniques used in investigation of literary subjects.

212-754. History and Structure of the English Language Credit 3(3-0)
(Formerly English 2494)

A study of the changes in the English language-syntax, vocabulary, spelling, pronunciation, and usage from the fourteenth century through the twentieth century.

212-755. Contemporary Practices in Grammar and Rhetoric Credit 3(3-0)
(Formerly English 2495)

A course designed to provide secondary teachers of English with experiences in Linguistics applied to modern grammar and composition.

212-760. Non-fiction by Afro-American Writers Credit 3(3-0)

A study of non-fiction by black writers including slave narratives, autobiographies, biographies, essays, letters and orations.

212-762. Short Fiction by Afro-American Writers Credit 3(3-0)

An extensive examination of short fiction by Afro-American writers. Among those included are Chesnutt, Dunbar, Toomer, Hurston, McKay, Hughes, Bontemps, Wright, Clarke, Ellison, Fair, Alice Walker, Ron Milner, Julia Fields, Jean W. Smith, Petry, Baldwin, Kelley, and Jones.

212-764. Black Aesthetics Credit 3(3-0)

A definition of those qualities of black American literature which distinguish it from traditional American literature through an analysis of theme, form, and technique as they appear in a representative sample of works by black writers.

212-766. Seminar in Afro-American Literature and Language Credit 3(3-0)

A topics course which will vary; focus will be on prominent themes and/or subjects treated by Afro-American writers from the beginning to the present. An attempt will be made to characterize systematically the idiom (modes of expression, style) of Afro-American Writers.

212-770. Seminar Credit 3(3-0)
(Formerly English 2499)

Provides an opportunity for presentation and discussion of thesis, as well as select-ed library or original research projects from non-thesis candidates. Prerequisite: 15 hours of graduate-level courses in English.

212-775. Thesis Research Credit 3(3-0)

HEALTH, PHYSICAL EDUCATION AND RECREATION

Roy D. Moore, Chairperson

Office: Moore Gymnasium

The Department of Health, Physical Education and Recreation offers a Master of Science degree in Education with a concentration in Physical Education.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate must hold or be qualified to hold a Class A teaching certificate in Health, Physical Education and Recreation.

Requirements for a Degree

Non-thesis Option: 30 s.h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. Physical Education 785, 786, and 798
2. 9 s.h. in Physical Education Courses
3. 6 s.h. in Electives

Thesis Option: 30 s.h. required

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must complete the following:

1. Physical Education 785, 786, 798, and 799
2. 6 additional s.h. in Physical Education Courses
3. 6 s.h. in electives

For Advanced Undergraduates and Graduates

HEALTH EDUCATION

330-651. Personal, School and Community Health Problems Credit 3(3-0)

A study of personal, school and community health problems and resources. Emphasis is placed on the control of communicable diseases, healthful school living and the development in individuals of the scientific attitude and a positive philosophy of healthful living.

330-652. Methods and Materials in Health Education for Elementary and Secondary School Teachers Credit 3(3-0)

A study of the fundamentals of the school health program, pupil needs, methods, planning, instruction teaching techniques, selection and evaluation of materials for the elementary and secondary programs, and the use of the community resources.

PHYSICAL EDUCATION

330-655. Current Problems and Trends in Physical Education Credit 3(3-0)

A practical course for experienced teachers. Consideration given to individual problems in physical education with analysis of present trends.

330-656. Administration of Interscholastic and Intramural Athletics Credit 3(3-0)

A study of the relation of athletics to education, and the problems of finance, facilities, scheduling, eligibility, and insurance. Consideration given to the organization and administration of intramural activities in the school program.

330-657. Community Recreation

Credit 3(3-0)

A study of recreational facilities and problems with consideration being given to the promotion of effective recreational programs in rural and urban communities.

330-658. Current Theories and Practices of Teaching Sports.

Credit 3(3-0)

Methodology and practice at various skill levels. Emphasis is placed on seasonal activity.

330-669. Physiology of Exercise

Credit 3(2-2)

The purpose of this course is to observe and record the effects of physical activity on the organic systems and service organs of the human body and to learn basic laboratory techniques and procedures of physical education.

330-679. Prescribed Methods of Rehabilitating The Physically Handicapped

Credit 3(3-0)

This course is designed to train the student in the use of therapeutic exercise as it applies to physical rehabilitation of the physically handicapped. There will be discussions and laboratory practice of physiological and kinesiological principles of physical restoration.

For Graduates Only**PHYSICAL EDUCATION****330-780. Organization and Administration of Health, Physical Education and Recreation in Elementary Schools**

Credit 3(3-0)

This course studies the modern developments in methods and materials of elementary school physical education. Prerequisite: Consent of the instructor.

330-785. Research in Health, Physical Education and Recreation

Credit 3(3-0)

A course that is designed to study the various methods of investigating and principles underlying the work in the field of health, physical education and recreation. Prerequisite: Consent of the instructor.

330-786. Scientific Foundations of Physical Education

Credit 3(3-0)

A course designed to discuss scientific approaches to physical education and methods of applying these scientific investigations to the classroom. Prerequisite: Consent of the instructor.

330-787. Scientific Foundations of Physical Fitness

Credit 3(3-0)

A study of the concepts of physical fitness and the application of these concepts to school and community programs. Prerequisites: Consent of the instructor.

330-798. Seminar

Credit 3(3-0)

A course of study in which the research projects are prepared, discussed, and evaluated by the faculty and students.

HISTORY

Frank C. Bell, Chairperson
Office: 318 Hodgin Hall

The Department of History offers a Master of Science degree in Education with concentration in History or Social Science.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree program in Education, a student wishing to be accepted as a candidate for the degree of Master of Science in Education with a concentration in History of Social Sciences must hold or be qualified to hold a Class A teaching certificate in History of Social Sciences. A graduate student seeking certification for teaching history or the social sciences must complete a graduate course in methods of teaching the social sciences.

Requirements for the Degree

To complete the requirements for the degree of Master of Science in Education with a concentration in History or Social Science, the student may elect the thesis option or the non-thesis option.

HISTORY

Non-thesis Option

Thirty semester hours required in courses at the 600 level or above.

1. 21 semester hours in history (Political Science 645 and Political Science 730 are accepted for history credit).
2. 6 semester hours in education (Education 701 or 625 or 703 and Education 720 or 722 or Psychology 726).
3. 3 semester hours in electives

Thesis Option

Thirty semester hours required in courses at the 600 level or above including the thesis.

1. 15 semester hours in history
2. 6 semester hours in education (Education 701 or 625 or 703 and Education 720 or 722 or Psychology 726)
3. 6 semester hours thesis
4. 3 semester hours in electives

SOCIAL SCIENCE

Non-thesis Option

Thirty semester hours required in courses at the 600 level or above.

1. 21 semester hours in social science courses.
2. 6 semester hours in education (Education 701 or 625 or 703 and Education 720 or 722 or Psychology 726)
3. 3 semester hours in electives

Thesis Option

Thirty semester hours required in courses at the 600 level or above including the thesis.

1. 15 semester hours in social science courses
2. 6 semester hours in education (Education 701 or 625 or 703 and Education 720 or 722 or Psychology 726)
3. 6 semester hours thesis
4. 3 semester hours in electives

HISTORY

Courses for Advanced Undergraduates and Graduates

600. The British Colonies and the American Revolution Credit 3(3-0)

Intensive analysis of special problems in Colonial and Revolutionary America.

603. The Civil War and Reconstruction Credit 3(3-0)

This course begins with a summary of the Civil War, then treats the historiography of the Reconstruction Period, the Reconstruction of the South, and the restoration of the Union.

605. Seminar on the Soviet Union Credit 3(3-0)

A seminar course on the Soviet Union including extensive reading and discussion and a major research paper.

606. United States History, 1900-1932 Credit 3(3-0)

This course traces the political, economic, and social forces operating in the United States and their effect upon the people. Emphasis will be placed upon the Progressive Movement, World War I, and the Great Depression.

607. United States History, 1932-Present Credit 3(3-0)

(A continuation of History 606)

Emphasis will be placed upon the New Deal, World War II, and the Social Revolution in the 1960's.

615. Seminar in the History of Black America Credit 3(3-0)

A reading, research, and discussion course which concentrates attention on various aspects of the life and history of Afro-Americans.

616. Seminar in African History Credit 3(3-0)

Research, writing and discussion on selected topics in African history.

617. Readings in African History Credit 3(3-0)

By arrangement with instructor.

625. Seminar in Historiography and Historical Method Credit 3(3-0)

The study of the writing of history as well as training in research methodology and communication.

626. Revolution in the Modern World Credit 3(3-0)

A comparative study of revolutionary movements and outbreaks with special emphasis on the French, Russian, and Chinese Revolutions plus an evaluation of theories of revolution in light of historical examples.

630. Studies in European History, 1815-1914 Credit 3(3-0)

Intensive study of selected topics in Nineteenth Century European history.

631. Studies in Twentieth Century Europe, 1914 to the Present Credit 3(3-0)

Reading course in contemporary European history since 1914.

633. Independent Study in History Credit (1-3)

By arrangement.

***645. American Foreign Policy—1945 to Present** Credit 3(3-0)

Examination of forces and policies that have emerged from Potsdam, Yalta, and World War II. Emphasis will be on understanding the policies that were formulated, why they were formulated, the consequences of their formulation, and the alternative policies that may have come about. Prerequisites: Survey course in American history, American Diplomatic history or consent of instructor.

*Political Science 645 is accepted for history credit.

Courses for Graduates Only

- 701. Recent United States Diplomatic History** Credit 3(3-0)
- 712. The Black American in the Twentieth Century** Credit 3(3-0)
- 730. Seminar in History** Credit 3(3-0)
- *730. Constitutional Development Since 1865** Credit 3(3-0)

Historical study of the development of the Constitution since 1865. Treatment will be given to important Constitutional decisions, major documents, major Supreme Court decisions, and public policy. Assignments in paperback books will be frequent.

- 740. History, Social Sciences, and Contemporary World Problems** Credit 3(3-0)

Readings, discussions, and reports on the relationships between history and the social sciences as a whole as their combined role in dealing with contemporary world problems.

- 750. Thesis in History** Credit (3-6)

Thesis work will be done with the appropriate instructor in accordance with field of interest.

- **725. Problems and Trends in Teaching the Social Sciences** Credit 3(3-0)

Current strategies, methods, and materials for teaching the social sciences. Emphasis on innovations, evaluation and relation to learning. Provision for clinical experiences.

*Political Science 730 is accepted for history credit.

**Education 725 is required for graduate students seeking certification in the social sciences.

PHILOSOPHY

Advanced Undergraduate and Graduate

- 233-608. Culture and Value** Credit 3(3-0)
(Formerly 5970)

A critical study of the nature and justification of basic ethical concepts in light of historical thought.

- 233-609. Contemporary Philosophy** Credit 3(3-0)
(Formerly 5971)

A critical investigation of some contemporary movements in philosophy with special emphasis on existentialism, pragmatism, and positivism.

GEOGRAPHY

Advanced Undergraduate and Graduate

- 233-640. Topics in Geography of Anglo-America** Credit 3(3-0)
(Formerly 610)

Selected topics in cultural geography of the United States and Canada are studied

intensively. Emphasis is placed upon individual reading and research and upon group discussion.

233-641. Topics in World Geography Credit 3(3-0)
(Formerly 720)

Selected topics in world geography are studied intensively. Concern is for cultural characteristics and their interrelationships with each other and with habitat. Emphasis is upon reading, research and discussion.

233-650. Physical Geography I Credit 3(3-0)
(Formerly 605)

A study of the surface of the earth, including means of representation of the earth's surface, physical elements of weather and climate, climatic regions, and the earth's waters and elements.

233-651. Physical Geography II Credit 3(3-0)
(Formerly 606)

A continuation of Physical Geography I concentrating on climate and weather, natural vegetation and animal life, soils and association of physical landscape attributes.

HOME ECONOMICS
Harold E. Mazyck, Chairperson
Office: Benbow Hall

The Department of Home Economics offers a program leading to the Master of Science degree as listed earlier in this catalog in the description of degree programs.

The department also offers courses for individuals desiring advanced study in child development, clothing, textiles and related arts, home economics education, food administration, and for those seeking renewal of teaching certificates.

FOOD AND NUTRITION

Advanced Undergraduate and Graduate

170-630. Advanced Nutrition Credit 3(3-0)

Intermediate metabolism and interrelationships of organic and inorganic food nutrients in human biochemical functions. Prerequisites: Home Economics 337 and Chemistry 251, 252 or equivalent.

170-631. Advanced Food Science Credit 3(2-2)

Advanced discussion and experimentation with the chemical and physical changes of food during processing and storage. Prerequisite: Home Economics 436 or equivalent.

170-632. Food and Nutrition in Early Childhood Credit 3(3-0)

A study of the elementary principles of nutrition and their influence on the growth and development of children. Special consideration is given to nutrition education techniques to be used with children and parents in pre-school centers and elementary schools.

170-635. Introduction to Research Methods in Food and Nutrition Credit 3(0-6)

Laboratory experiences in the use of methods applicable to food and nutrition research. Prerequisite: Consent of the Instructor.

170-636. Food Promotion

Credit 4(1-6)

A course which gives experiences in the development and testing of recipes. Opportunities will be provided for demonstrations, writing and photography with selected businesses.

170-637. Special Problems in Food and Nutrition

Credit 3(0-6)

Individualized research on a selected problem in food or nutrition. Prerequisite: Home Economics 635.

For Graduate Students Only**170-730. Nutrition in Health and Disease**

Credit 5(3-4)

Significance of nutrition in health and disease. Consideration of: (1) the methods of appraisal of human nutritional status to include clinical, dietary, biochemical, and anthropometric techniques, (2) various biochemical parameters used to diagnose and treatment of the disorders, and (3) the role of diet as a therapeutic tool. Prerequisite: Home Economics 630 or equivalent.

170-733. Nutrition During Growth and Development

Credit 3(2-2)

Nutritional, genetical and environmental influences on human growth and development. Prerequisite: Home Economics 630 or equivalent.

170-734. Nutrition Education

Credit 3(2-2)

Interpretation of human nutrition research findings for use in the development of course content and instructional media for nutrition education. Consideration will be given to adapting materials for variations in age, education and socio-economic levels.

170-735. Experimental Food Science.

Credit 4(1-6)

Experimental approach to the study of food preparation quality, deterioration, and safety. Prerequisite: H.Ec. 436 or equivalent.

170-736. Research Methods in Food and Nutrition.

Credit 4(1-8)

Theoretical consideration of techniques used in human metabolism study; retention and requirements of nutrients. Critical analysis of the methods used in surveys of nutritional status study. Advanced analytical, biological and microbiological techniques used in food and nutrition research, conduct animal experiments and analysis of food and biological materials. Prerequisite: F&N 635 and Statistics.

170-738. Food Testing and Evaluation

Credit 3(2-2)

A study of factors affecting the color, flavor, odor and texture of foods through the use of subjective and objective testing methods. Prerequisite: H.Ec. 436 or equivalent.

170-739. Thesis Research

Credit 3(0-6)

Research problems in food or nutrition.

170-740. Community Nutrition

Credit 3(3-0)

(Individualized work or team teaching or guest speakers?)

Application of the principles of nutrition to various community nutrition problems of specific groups (geriatrics, preschoolers, adolescents and expectant mothers). Evaluation of nutrition programs of public health and social welfare agencies at local, state, federal and international levels.

170-741. Current Trends in Food Science

Credit 3(3-0)

Recent developments in food science and their implications for teachers, nutritionists, extension workers, and dietitians.

170-742. Cultural and Social Aspects of Food and Nutrition. Credit 3(3-0)

Sociological, psychological, and economical background of ethnic groups and their influence on food consumption patterns, and nutritional status.

170-743. Food Preservation Credit 3(2-2)

A study of current methods of preserving foods—canning, freezing, dehydration, radiation and fermentation. Prerequisite: H.Ec. 436 or equivalent.

170-744. Seminar in Food & Nutrition Credit 2(2-0)

(Required of all graduates in Food and Nutrition) Lecture and discussion by faculty, students, and guests.

170-745. Practicum in Food or Nutrition Credit 3(0-6)

Field experiences with private and public agencies.

170-746. Internship in Home Economics Education Credit 6(0-12)

Internship in Home Economics Education is required of any person who has not had previous teaching experience. Internship must include an extended period of involvement in a school's program during a regular school term. Internship will provide opportunity for participation in the total school program including, curriculum, work with teachers, administrators, students and parents. This experience will serve as an equivalent of or facsimile of student teaching experience.

170-624. Advanced Textiles Credit 3(2-2)
(Formerly C.T.R.A. 1872)

A study of the physical and chemical properties of textile fibers and fabrics with emphasis on recent scientific and technological developments.

170-625. Experimental Clothing and Textiles Credit 3(1-4)

Experimentation with new woven fabrics and non-textiles such as furs, leathers, and suedes.

HOME ECONOMICS

Advanced Undergraduate and Graduate

170-603. Special Problems in Home Economics I Credit 3(1-4)
(Formerly H.Ec. 1974)

Problems in the various areas of Home Economics with implications for secondary teaching may be chosen for individual study.

170-604. Seminar in Home Economics Education Credit 2(2-0)
(Formerly H.Ec. 1974)

Consideration of problems resulting from the impact of social change on the various fields of Home Economics in relation to the secondary school vocational homemaking programs.

FOOD ADMINISTRATION

Advanced Undergraduate and Graduate

170-645. Special Problems in Food Administration Credit 2(0-4)
(Formerly I.M. 1975)

Individual work on special problems in food administration.

170-646. Readings in Food Administration Credit 1(1-0)
(Formerly I.M. 1976)

A study of food administration through reports and discussion of articles in current trade periodicals and scientific journals.

170-647. Seminar in Food Administration Credit 1(1-0)
(Formerly I.M. 1977)

Discussion of problems involved in the organization and management of specialized food service areas.

HOME ECONOMICS

Graduate

170-706. Special Problems in Home Economics II Credit 3(3-0)
(Formerly H.Ec. 1986)

A study of research and major contemporary issues with consideration of their impact on trends and new directions in home economics.

CHILD DEVELOPMENT

Advanced Undergraduate and Graduate

170-612. Senior Seminar
(Formerly CD 1972)

A review of recent research findings and discussion of current trends and information related to young children. Concurrent with Education 558.

Graduate

170-715. Special Problems in Child Development Credit 3(3-0)
(Formerly 1985)

Opportunity for students to work individually or in small groups on child development problems of special interest. Work may represent either survey of a given field or intensive investigation of a particular problem. The student should consult the instructor before registering for this course.

CLOTHING, TEXTILES, AND RELATED ARTS

Advanced Undergraduate and Graduate

170-620. Fashion Coordination Credit 1(1-0)
(Formerly C.T.R.A. 1870)

A study of the factors which influence the fashion world; trends, designers, centers and promotion. Field trips to fashion centers.

170-621. Seminar in Clothing, Textiles and Related Art Credit 1(1-0)
(Formerly C.T.R.A. 1871)

A study of current trends in the field of Clothing, Textiles, and Related Art.

170-622. Economics of Clothing and Textiles Credit 2(2-0)
(Formerly C.T.R.A. 1872)

A study of the economic aspects of clothing and household textiles as they relate to family needs and resources in their quest for maximum satisfaction and serviceability.

170-623. Textile Chemistry Credit 3(1-4)

An introduction to the chemistry of the major classes of natural and manmade fibers, including their structure, properties, and reactions. Laboratory work will in-

clude consideration of chemical damage to fabrics, finishes, and dyes. Prerequisites: Chemistry 104 and 105, Textiles 123.

INDUSTRIAL EDUCATION
George C. Gail, Chairperson
Office: Price 105

For admission to the degree and for requirements, see the degree programs listed previously in the catalogue.

INDUSTRIAL EDUCATION

Advanced Undergraduate and Graduate

361-616. Plastic Craft Credit 3(2-2)

For teachers of industrial arts, arts and crafts and those interested in plastics as a hobby. Operations in plastics analyzed and demonstrated; design, color, kinds, and uses of plastics, how plastics are made and sold vocational information. Projects suitable for class use constructed.

361-617. General Crafts Credit 3(2-2)

Principles and techniques of crafts used in school activity programs. Emphasis is on materials, tools and processes used in elementary schools and industrial art courses. Open to all persons interested in craft instruction for professional or non-professional use.

361-618. Elementary School Industrial Education Programs Credit 3(3-0)

Aims, content, equipment and methods utilized in programs designed to integrate K-6 elementary school activities with the study of industry and technology.

361-619. World of Construction Credit 3(2-2)

Industrial Arts Curriculum Project Workshop encompassing rational, strategies, techniques and media. Prerequisite for middle grade teachers initiating course in the "World of Construction" or "World of Manufacturing."

361-620. World of Manufacturing Credit 3(2-2)

(See 619 course description)

361-630. Photography and Educational Media Credit 3(2-1)

Nomenclature, operation and maintenance of various still and motion picture cameras. The use of exposure meters—film processing—contact printing—slide preparation—film editing—copying—enlarging—preparation and storage of chemical solutions—print spotting—dry mounting.

361-635. Graphic Arts Credit 3(2-2)

Fundamentals of typography, hand composition, press operation, block printing, screen printing, offset lithography, other reproduction methods, and bookbinding.

361-660. Industrial Cooperative Programs Credit 3(3-0)

For prospective teachers of vocational education. Principles, organization and administration of industrial cooperative.

361-661. Organization of Related Study Materials Credit 3(3-0)

Principles of scheduling and planning pupil's course and work experience; selecting

and organizing related instructional materials in I.C.T. programs. Prerequisite: I.E. 660

361-662. Industrial Course Construction Credit 3(3-0)

Selecting, organizing and integrating objectives, content, media and materials appropriate to industrial courses. Strategies and techniques of designing and implementing group and individual teaching-learning activities to develop interest awareness or specialization. Prerequisites: IE 462, 463, 465.

361-663. History and Philosophy of Industrial Education Credit 3(3-0)

Chronological and philosophical development of industrial education with special emphasis on its growth and function in American schools.

361-664. Occupational Exploration for Middle Grades Credit 3(3-0)

Designed for persons who teach or plan to teach middle grades occupational exploration programs. Emphasis will be placed on occupational exploration in the curriculum, sources and uses of occupational information, approaches to middle grades teaching, and philosophy and concepts of occupational education.

Graduate Courses

361-715. Comprehensive General Shop Credit 3(2-2)

Problems involving wood, electricity-electronics, graphic arts, metal and crafts; emphasis on organization, instructional materials and procedures.

361-717. Industrial Education Problems I Credit 3(2-2)

An advanced study in modern technology, may deal with recent developments, trends, practices and procedures of manufacturing and construction industries. Individual and group research and experimentation, involving selection, design, development and evaluation of technical reports and instructional materials for application in Industrial Education program. Prerequisite: 510 or 715.

361-718. Industrial Education Problems II Credit 3(2-2)

Continuation of 717.

361-719. Advanced Furniture Design and Construction Credit 3(2-2)

Laws, theories and principles of aesthetic and structural design, planning, designing, pictorial sketching and furniture drawing. Laboratory work involving setting up, operating, and maintaining furniture production equipment, plus firms, requisitions, orders, invoices, stock, bills, buying and professional problems. Prerequisite: Permission from instructor.

361-731. Advanced Drafting Techniques Credit 3(2-2)

For teachers with undergraduate preparation or trade experience. School of techniques, standards, conventions, devices, experimentation in advance of opportunities offered in regular courses. Use of literature and research expected.

361-762. Construction and Use of Instructional Aids Credit 3(2-2)

The analysis of various instructional aids useful in shop teaching, planning, designing, and construction of various teaching aids. Facilities for laboratory work provided.

361-763. General Industrial Education Programs Credit 3(3-0)

A study of the development of local, state, and national levels of day industrial

schools, evening industrial schools, part-time day and evening schools. Their organizations, types, courses of study, scope of movement; study of special student groups, fees, and charges, building and equipment.

361-764. Supervision and Administration of Industrial Education

A study of the relation of industrial education to the general curriculum and the administration responsibilities involved. Courses of study, relative costs, coordination problems, class and shop organization, and the development of an effective program of supervision will be emphasized.

361-765. Evaluation in Industrial Subjects Credit 2(3-0)

Study and application of principles of achievement test construction to industrial subjects; evaluation of results.

361-766. Curriculum Laboratory in Industrial Education Credit 3(3-0)

Principles and preparation of instructional materials for classroom use. Students select and develop significant areas of instruction for use in industrial courses. Courses of study that function in teaching situations are prepared. Opportunity offered to analyze existing courses of study.

361-767. Research and Literature in Industrial Education Credit 3(3-0)

Research techniques applied to technical and educational papers and thesis; classification of research, selection, delineation and planning; collection, organization and interpretation of data; survey of industrial education literature.

361-768. Industrial Education Seminar Credit 3(3-0)

Designed to enable non-thesis graduate majors to complete educational and technical investigations. Each student will be expected to plan and complete a research paper and present a summary of his findings to the seminar.

361-769. Thesis Research in Industrial Education Credit 3

INDUSTRIAL TECHNOLOGY
Arlington Chisman, Chairperson
Office: Price 114

Advanced Undergraduate and Graduate

363-651. Power Industries and Technology Credit 3(2-2)

Significance of modern power sources in Industrial Technology. Design and operating principles of steam, water hydraulic, pneumatic, internal and external combustion units. Nuclear, hydro-electric, gasoline, diesel, turbine rocket, jet, fuel cells, solar energy and other systems. Laboratory experiences involving utilization of power equipment, testing and servicing, with major emphasis on portable power plants.

363-673. Advanced General Metals I Credit 3(2-2)

A course in metalwork for teachers of industrial arts. Emphasis will center on art metal (including plating, finishing, etc.), advanced bench metal, sheet metal operations and machine shop. Specifications for equipment, organization of instruction sheets, special problems and materials will be covered as well as shop organization. Prerequisite: I.T. 471.

363-674. Advanced General Metals II

Credit 3(2-2)

An advanced course in metalwork for the industrial arts teacher or other persons who may require more specialization in one area of metalwork. With the necessary prerequisites, the student may select any area of general metals for concentration and special study. Construction of projects, special assignments, etc., will be made after the area of work is selected and after consultation with the instructor. Prerequisite: 673.

For Graduate Students Only**363-735. Communications**
(Formerly I.A. 3585)

Credit 3(2-2)

For teachers and prospective teachers of Industrial Arts. Emphasis placed on the selection and construction of projects useful in school shops, development of selected information. Theory and fundamentals of electronic navigation and communication, selecting equipment and supplies, course organization and instructional materials.

MATHEMATICS
Wendell P. Jones, Chairperson
Office: Merrick Hall M101

The Department of Mathematics offers two curricula leading to the Master of Science in Education. One is intended primarily for individuals preparing to teach mathematics in junior or senior high school. The second is intended for individuals preparing to teach mathematics in senior high school or junior college, or planning to continue with graduate studies leading to a doctorate in mathematics.

Requirements for Admission to a Degree Program

In addition to the general requirements specified in the description of the degree programs in Education, a student wishing to be accepted as a candidate for the Master's degree program in Education with a concentration in Mathematics must have earned thirty (30) semester hours in mathematics including differential and integral calculus and differential equations. A student who fails to meet these qualifications will be expected to satisfy the requirements by enrolling in undergraduate courses before beginning his graduate studies in mathematics.

Requirements for a Degree

A student may not receive credit for a course which is equivalent to one for which he has received an undergraduate grade of "C" or above.

JUNIOR HIGH-SENIOR HIGH CURRICULUM

Non-thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science in Education, the student must satisfy the following:

1. At least one mathematics course numbered higher than 626.
2. 15 additional hours from the following: Mathematics 600, 601, 602, 603, 604, 607, 620, 623, 624, 651, 652, 700, 701, 710, 711, 715, 717, 720.
3. An elective of 3 semester hours in education or mathematics or courses related to mathematics.

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a

Master of Science in Education, the student must satisfy the following:

1. At least one mathematics course numbered higher than 626.
2. 15 additional semester hours in mathematics from the following: Mathematics 600, 601, 602, 603, 604, 607, 620, 623, 624, 651, 652, 700, 701, 710, 711, 715, 717, 720.
3. A thesis focused on research in mathematics or in the teaching of mathematics.
4. 3 hours of electives.

SENIOR HIGH-JUNIOR COLLEGE CURRICULUM

Non-thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, a student must complete the following:

1. 9 semester hours in mathematics courses numbered higher than 626.
2. 9 additional hours from the following: 600, 601, 602, 604, 607, 620, 623, 624, 651, 652, 700, 701, 710, 711, 715, 717, 720.
3. An elective of 3 semester hours in education or mathematics or courses related to mathematics.

Thesis Option: 30 s.h. required.

In addition to the courses specified in the description of general requirements for a Master of Science degree in Education, a student must complete the following:

1. 9 semester hours in mathematics courses numbered higher than 626.
2. 9 additional hours from the following: Mathematics 600, 601, 602, 603, 604, 607, 620, 623, 624, 651, 652, 700, 701, 710, 711, 715, 717, 720.
3. A thesis requiring research on a problem in the field of mathematics.
4. 3 hours of electives.

Advanced Undergraduate and Graduate

225-600. Introduction to Modern Mathematics for Secondary School Teachers

Credit 3(3-0)

(Formerly Mathematics 3670)

A study of the elementary theory of sets, elementary logic and postulational systems, the nature and methods of mathematical proofs, structure of the real number system. Open only to inservice teachers, or by permission of Department of Mathematics.

225-601. Algebraic Equations for Secondary Teachers

(Formerly Math. 3671)

Algebra of sets, solution sets for elementary equations, linear equations and linear systems of equations, matrices and determinants with applications to the solution of linear systems. Prerequisite: Math 600.

225-601. Modern Algebra for Secondary School Teachers

Credit 3(3-0)

(Formerly 3672)

Sets and mappings, properties of binary operations, groups rings, integral domains, vector spaces and fields. Prerequisite: Math 600.

225-603. Modern Analysis for Secondary School Teachers

Credit 3(3-0)

(Formerly 3673)

Properties of the real number system, functions, limits, sequences, continuity, differentiation and differentiability, integration and integrability. Prerequisite: Math 600.

225-604. Modern Geometry for Secondary School Teachers Credit 3(3-0)
(Formerly 3674)

Re-examination of Euclidean geometry, axiomatic systems and Hilbert axioms, introduction of projective geometry, other non-Euclidean geometries. Prerequisite: Math 600.

225-606. Mathematics for Chemists Credit 3(3-0)
(Formerly Math. 3676)

This course will review those principles of mathematics which are involved in chemical computations and derivations from general through physical chemistry. It will include a study of significant figures, methods of expressing large and small numbers, algebraic operations, trigonometric functions, and an introduction to calculus.

225-607. Theory of Numbers Credit 3(3-0)
(Formerly Math. 3677)

Divisibility properties of the integers. Euclidean algorithm, congruences, diophantine equations, number-theoretic functions, and continued fractions. Prerequisite: Twenty hours of college mathematics.

225-608. Mathematics of Life Insurance Credit 3(3-0)
(Formerly Math. 3678)

Probability, mortality tables, life insurance, annuities, endowments; computation of net premiums; evaluation of policies; construction and use of tables. Prerequisite: Math 224.

225-620. Elements of Set Theory and Topology Credit 3(3-0)
(Formerly Math. 3682)

Operations on sets, relations, correspondences, comparison of sets, functions, ordered sets, general topological spaces, metric spaces, continuity, connectivity, compactness, homeomorphic spaces, general properties of T-spaces. Prerequisite: Math 222.

225-623. Advanced Probability and Statistics Credit 3(3-0)
(Formerly Math. 3683)

Introduction to probability, distribution functions and moment-generating functions, frequency distribution of two variables, development of chi-square, students' "T" and "F" distributions. Prerequisite: Math 222.

225-624. Method of Applied Statistics Credit 3(3-0)
(Formerly Math 3684)

Presents the bases of various statistical procedures. Applications of normal, binomial, Poisson, Chi-square, students' "T" and "F" distributions. Tests of hypothesis, power of tests, statistical inference, regression and correlation analysis and analysis of variance. Prerequisite: Math 224.

For Undergraduate Student Only

225-625. Modern Mathematics for Elementary School Teachers I Credit 3(3-0)
(Formerly Math. 3685)

A study of mathematic language, sets, relations, number systems, bases, structures, informal geometry, computation. No credit towards a degree in mathematics; not open to secondary school teachers of mathematics. Credit on elem. ed. degree.

225-626. Modern Mathematics for Elementary School Teachers II Credit 3(3-0)
(Formerly 3686)

A continuation of Math. 725. Prerequisite: Math. 725 (Formerly 3685). No credit towards a degree in mathematics; not open to secondary school teachers of mathematics. Credit on elem. ed. degree.

225-631. Linear and Non-Linear Programming Credit 3(3-0)

Optimization subject to linear constraints; transportation problems; simplex method, network flows, applications of linear programming to industrial problems and economic theory. Introduction to non-linear programming. Prerequisite: Math 350 and consent of the instructor.

225-632. Games and Queue Theory Credit 3(3-0)

General introduction to game theory; two-person-zero-sum-games; two-person-non-zero-sum-non-cooperative games; two-person co-operative games; reasonable outcomes and values; the minimax theorem. Introduction to queuing theory; single server queuing processes; many server queuing processes; applications to economics and business. Prerequisite: Mathematics 222 or Mathematics 117, Mathematics 224.

225-651. Methods in Applied Mathematics I Credit 3(3-0)

An introduction to complex variables and residue calculus, transform calculus (Fourier, Laplace, Hankel, Mellin, etc. Transforms), higher order partial differential equations governing various physical phenomena, non-homogeneous boundary value problems, orthogonal expansions, Green's functions and variational principles. Prerequisite: Mathematics 300.

225-652. Methods of Applied Mathematics II Credit 3(3-0)

An introduction to integral equations and conversion of differential problems into integral equations of Volterra and Fredholm types, solution by iteration and other methods, existence theory, eigenvalue problems, Hilbert-Schmidt theory of symmetric kernels and topics in the calculus of variation, including optimization of integrals involving functions of more than one variable, Hamilton's principles, Strum-Liouville theory, Rayleigh-Ritz methods, etc. Prerequisite: Mathematics 300.

For Graduate Students Only

225-700. Theory of Functions of a Real Variable I Credit 3(3-0)
(Formerly Math. 3690)

A study of point set theory, metric spaces, measurable sets, measurable functions, Lebesgue integral of a bounded function, L spaces. Prerequisite: Math. 508 and 620.

225-701. Theory of Functions of a Real Variable II Credit 3(3-0)
(Formerly Math. 3691)

Continuation of Mathematics 700.

225-710. Theory of Functions of a Complex Variable I Credit 3(3-0)
(Formerly Math. 3692)

A study of complex numbers, elementary functions, analytic functions, residue calculus, conformal mapping, Taylor and Laurent expansions. Prerequisite: Math. 508.

225-711. Theory of Functions of a Complex Variable II Credit 3(3-0)
(Formerly Math. 3693)

Continuation of Mathematics 710.

225-715. Projective Geometry Credit 3(3-0)
(Formerly Math. 3694)

A study of homogenous coordinates, linearly dependent points and lines, the principle of duality, harmonic points, harmonic lines, conics, projective and affine transformations. Prerequisites: Math. 601, 242, and 350.

225-717. Special Topics in Algebra Credit 3(3-0)
(Formerly Math. 3695)

A study of advanced topics in algebra which do not receive full development in the prerequisite courses. Prerequisite: Math. 5112 or Math. 520.

225-720. Special Topics in Analysis Credit 3(3-0)
(Formerly Math. 3696)

A study of advanced topics in analysis.

225-730. Thesis Research in Mathematics Credit 3(3-0)
(Formerly Math. 3699)

MUSIC

William McDaniel, Chairperson
Office: Frazier Hall

Courses for Advanced Undergraduate and Graduate

219-609. Music in Early Childhood Credit 3(2-2)

A conceptual approach to the understanding of musical elements; an understanding of the basic activities in music in early childhood; modern trends in music education: Kodaly and Orff methods.

219-610. Music in Elementary Schools Today Credit 3(2-2)

Music in the elementary school curriculum; creating a musical environment in the classroom; child voice in singing, selection and presentation of rote songs; development of rhythmic and melodic expressions; directed listening; experimentation with percussion and simple melodic instruments; criteria for utilization of notational elements; analysis of instrumental materials.

219-611. Music in the Secondary Schools Today Credit 3(3-0)

Techniques of vocal and instrumental music instruction in the junior and senior high schools; the general music class; the organization, administration and supervision of music programs, as well as music in the humanities. This course includes the adolescent's voice and its care; the testing and classification of voices; operetta production; the instrumental program; and training glee clubs, choirs, bands, and instrumental ensembles.

219-614. Choral Conducting of School Music Groups Credit 2(0-4)

Rehearsal techniques; balance; blend and relationship of parts to the total ensemble; analysis and interpretation of literature appropriate for use in school at all levels of ability; conducting experience with laboratory group.

219-616. Instrumental Conducting of School Music Groups Credit 2(0-4)

Rehearsal technique; balance, blend and relationship of parts to the total ensemble; analysis and interpretation of literature appropriate for use in school groups at all levels of ability; conducting experience with laboratory group.

219-618. Psychology of Music Credit 3(3-0)

An intensive examination of the psychological bases of musical behavior. Special at-

tention devoted to the psychological processes involved in musical perception and the implications for music education.

219-620. Advanced Music Appreciation

Credit 3(2-2)

Analytic studies of larger forms from all branches of music writing; special emphasis on style and structural procedures by principal composers; words taken from all periods in music history. Designed for students with previous study of music appreciation.

PHYSICS

Jason Gilchrist, Chairperson

Office: 109 Cherry Hall

For Graduate Students Only

227-705. General Physics for Science Teachers I

Credit 3(2-2)

(Formerly Physics 3885)

For persons engaged in teaching. Includes two hours of lecture demonstration and one two-hour laboratory period per week. Emphasis is placed upon understanding the basic principles of physics. Both courses may be combined during a single semester for double credit. For teachers only. Prerequisite: College degree.

227-706. General Physics for Science Teachers II

Credit 3(2-2)

(Formerly Physics 3886)

A continuation of Physics 705.

227-707. Electricity for Science Teachers

Credit 2(2-0)

(Formerly Physics 3887)

Includes electric fields potentials, direct current circuits, chemical and thermal emf's electric meters and alternating currents. For teachers. Prerequisite: College Physics.

227-708. Modern Physics for Science Teachers I

Credit 2(2-0)

(Formerly Physics 3888)

An introductory course covering the usual areas of modern physics. Both courses may be combined during a single semester for double credit. For teachers only. Prerequisite: College Physics.

227-709. Modern Physics for Science Teachers II

Credit 2(2-0)

(Formerly Physics 3880)

A continuation of Physics 708.

PLANT SCIENCE AND TECHNOLOGY

Samuel J. Dunn, Chairperson

Office: 235 Carver Hall

For Advanced Undergraduates and Graduates

AGRICULTURAL ENGINEERING

130-601. Advanced Farm Shop

Credit 3(1-4)

(Formerly Ag. Engr. 1476)

Study of the care, operation, and maintenance of farm shop power equipment. Prerequisite: Ag. Engr. 114.

- 130-602. Special Problems in Agricultural Engineering** Credit 3(0-6)
(Formerly Ag. Engr. 1477)

Special work in agricultural engineering on problems of special interest to the student. Open to seniors in Agricultural Engineering.

- 130-700. Rural Electrification for Vocational Agricultural Teachers** Credit 3(3-0)
(Formerly 1489)

Rural electrification for vocational teachers. A study of electricity with particular emphasis on its application to the home and farm.

CROP SCIENCE

- 130-603. Plant Chemicals** Credit 3(2-2)
(Formerly Crop Science 1478)

A study of the important chemical pesticides and growth regulators used in the production of economic plants. Prerequisites: Chem. 102 and Pl. Sc. 300.

- 130-604. Crop Ecology** Credit 3(3-0)
(Formerly Crop Science 1479)

Study of the physical environment and its influence on crops; geographical distribution of crops.

- 130-605. Breeding of Crop Plants** Credit 3(2-2)
(Formerly Crop Science 1480)

Significance of crop improvements in the maintenance of crop yields; application of genetic principles and techniques used in the improvement of crops; the place of seed certification in the maintenance of varietal purity.

- 130-606. Special Problems in Crops** Credit 3(3-0)
(Formerly Crop Science 1481)

Designed for students who desire to study special problems in crops. By consent of instructor.

- 130-607. Research Design and Analysis** Credit 3(2-2)
(Formerly Crop Science 1482)

Experimental designs, methods and techniques of experimentation; application of experimental design to plant and animal research; interpretation of experimental data. Prerequisite: Ag. Econ. 644 or Math. 224.

- 130-702. Grass Land Ecology** Credit 2(2-0)
(Formerly 1491)

The use of grasses and legumes in a dynamic approach to the theory and practice of grass-land agriculture, dealing with the fundamental ecological principles and their application to management practices.

EARTH SCIENCE

- 130-622. Environmental Sanitation and Waste Management** Credit 3(2-2)

Study of traditional and innovative patterns and problems of managing and handling waste products of urban and rural environments, their renovation and reclamation.

- 130-624. Earth Science, Geomorphology** Credit 3(2-2)

Various land forms and their evolution—the naturally evolved surface features of

the Earth's crust and the processes responsible for their evolution, their relation to man's activities and as the foundation for understanding the environment.

130-625. Earth Resources Credit 3(2-2)

Conservation, management and use of renewable and non-renewable resources. Their impact on the social and economic quality of our environment.

130-626. Aquaculture Credit 3(2-2)

Using water as a natural resource in the production of food, for recreation and wild-life preservation, and its management as it relates to environmental problems affecting water quality, with major emphasis on freshwater lakes and ponds.

130-627. Strategies of Conservation. Credit 3(2-2)

An approach to the teaching of environmental conservation as an integral part of the general curriculum.

EARTH SCIENCE

130-703. Topics in Earth Science Credit 2(2-0)
(Formerly 1492)

A discussion of special topics from astronomy, geology, soil genesis, meteorology, oceanography, and physical geography.

130-704. Problem Solving in Earth Science Credit 3(0-6)
(Formerly 1493)

A laboratory-demonstration course involving identification of earth materials, measurements in environmental processes, and field observation of natural physical phenomena.

130-705. The Physical Universe Credit 3(3-0)
(Formerly Earth Sc. 1494)

This course is designed to give the student a broad general background knowledge of the earth's physical environment; its lithosphere, hydrosphere and atmosphere and their interaction on weather and climate. The physical nature of the stars, the sun, and the planets will also be studied in the light of modern concepts of space.

130-706. Physical Geology Credit 3(3-0)
(Formerly Earth Sc. 1495)

The development of the earth's surface, its material composition and forces acting upon its surface will be considered. Specific topics include origin of mountains and volcanos, causes of earthquake, work of rivers, wind, waves and glaciers. Prerequisite: Ea. Sci. 705 or consent of instructor.

130-708. Conservation of Natural Resources Credit 3(3-0)
(Formerly Earth Sc. 1496)

A descriptive course dealing with conservation and development of renewable natural resources encompassing soil, water, and air; cropland, grassland, and forests; livestock, fish, and wildlife; and recreational, aesthetic and scenic values. Attention will be given to protection and development of the nation's renewable natural resources base as an essential part of the national security, defense, and welfare.

130-709. Seminar in Earth Science Credit 2(2-0)
(Formerly 1497)

A seminar concerned with recent developments in the earth sciences and related disciplines.

HORTICULTURE

- 130-608. Special Problems** Credit 3(3-0)
(Formerly Hort. 1483)

Work among special lines given largely by the project method for advanced undergraduate and graduate students who have the necessary preparation.

- 130-610. Commercial Greenhouse** Credit 3(2-2)
(Formerly 1449)

Culture of floriculture crops in the greenhouse and out-of-doors with emphasis on cut flowers and outside bedding plants. Special attention given to seasonal production. Prerequisite: Hort. 334.

- 130-611. Commercial Greenhouse Production** Credit 3(2-2)
(Formerly 1450)

Culture of floriculture crops in the greenhouse with emphasis on pot plants and conservatory plants. Special attention given to seasonal production. Prerequisite: Hort. 334.

- 130-612. Plant Materials and Landscape Maintenance** Credit 3(2-2)
(Formerly 1425)

Identification, merits, adaptability, and maintenance of shrubs, trees, and vines used in landscape planting, planting trees, shrubs, bulbs, and perennials. Prerequisite: Hort. 334, 335.

- 130-613. Plant Materials and Planning Design Credit** Credit 3(2-2)
(Formerly 1453)

Continuation of Horticulture 612 with added emphasis on plant combinations and use of plants as design elements. Prerequisite: Hort. 612.

SOIL SCIENCE

- 130-609. Special Problems in Soils** Credit 3(3-0)
(Formerly Soil Sci. 1484)

Research problems in soil for advanced students. By consent of instructor.

For Graduate Students Only

- 130-710. Soils of North Carolina** Credit 3(2-2)
(Formerly Soils 1498)

A study of the factors basic to the understanding of the soils of North Carolina, their classification and properties as related to sound land-use and management.

POLITICAL SCIENCE

Amarjit Singh, Acting Chairperson
Office: 308 Hodgkin Hall

POLITICAL SCIENCE

For Advanced Undergraduates and Graduates

- 237-640. Federal Government** Credit 3(3-0)
(Formerly Pol. Sc. 2976)

After a brief review of the structure and functions of the federal government, this course concerns itself with special areas of federal government: problems of national

defense, the government as a promoter, the government as regulator, etc. Students will engage in in-depth study in one of the specific areas under consideration.

238-641. State Government Credit 3(3-0)
(Formerly Pol. Sc. 2977)

An in-depth study of special problems connected with operations of state and local governments.

237-642. Modern Political Theory Credit 3(3-0)
(Formerly Pol. Sc. 5973)

Includes selected political works for adherence to modern conceptions of the state, political institutions as well as the works of Machiavelli, Hobbes, Spinoza, Rousseau, Burke, Mill, Hegel, Marx, and Dewey.

237-643. Urban Politics and Government Credit 3(3-0)
(Formerly Pol. Sc. 5975)

A detailed analysis of the urban political arena including political machinery, economic forces and political structures of local governmental units.

237-645. American Foreign Policy—1945 to Present Credit 3(3-0)
(Formerly Pol. Sc. 2976)

Examination of forces and policies that have emerged from Potsdam, Yalta, and World War II. Emphasis will be on understanding the policies that were formulated, how they were formulated, why they were formulated, the consequences of the formulation, and the alternative policies that may have come about. Prerequisites: Survey course in American history, American Diplomatic History, and consent of instructor. Enrollment limit of 15 students.

237-646. The Politics of Developing Nations Credit 3(3-0)
(Formerly Pol. Sc. 5974)

Political structures and administrative practices of selected countries in Africa, Latin America, Asia. Analysis of particular cultural, social and economic variable peculiar to the nations.

237-648. Urban Planning in the American Political System Credit 3(3-0)

An examination of issues involved in effective short and long range planning solutions to urban problems, and the politics of the urban planning process. Topics include: history of contemporary urban planning, comprehensive planning; urban growth patterns; land and energy conservation; and current urban plans and policies.

237-650. Seminar in Asian Politics Credit 3(3-0)

Development of political ideas and institutions with emphasis on dynamics of political modernization, problems of nation-building, political authority, political parties, and growth of political leadership at the rural and local levels.

237-653. Urban Problems Credit 3(3-0)

An analysis of some of the major problems in contemporary urban America. The course includes an examination of their causes, effects and possible solutions.

237-655. Public Personnel Administration Credit 3(3-0)

An examination of the leading trends in public employment, including recruitment, training, retention, interpersonal interaction, and collective bargaining.

For Graduate Students Only

- 237-730. Constitutional Development Since 1865** Credit 3(3-0)
(Formerly His. 2896)

Historical study of the development of the Constitution since 1865. Treatment will be given to important Constitutional decisions, major documents, major Supreme Court decisions, and public policy. Assignments in paperback books will be frequent.

- 237-741. Comparative Government** Credit 3(3-0)
(Formerly Pol. Sc. 2899)

Comparative analysis of the American system of government and selected foreign governments. Administration, organization, and processes in these systems of government will also be considered.

SAFETY AND DRIVER EDUCATION

I. Barnett, Chairperson

Office: Price 112

SAFETY AND DRIVER EDUCATION

Advanced Undergraduate and Graduate

- 360-651. Driver Ed. and Teaching Training** Credit 3(2-2)

This course provides the student with the necessary preparation to administer the in-car phase of high school driver education. Special attention will be given to methods of developing safe driving skills and habits.

- 360-652. Advanced Driver Education and Teacher Training** Credit 3(2-2)

Advanced professional preparation in teaching driver education. Laboratory experience with the multiple car range and driving simulator. Prerequisite: S.D. Ed. 651 or its equivalent.

- 360-653. Driver Education and General Safety** Credit 3(3-3)

Designed to present facts and information concerning the cost, in money and human suffering, of accidents in the home, industry, school, and transportation. Included in the establishment of knowledge and background conducive to the development of personal activities and practices which reduce accidents.

- 360-654. Highway Transportation Systems** Credit 3(3-0)

A description and analytical study of the various transportation systems that have developed in this country. Special emphasis will be given to transportation and its role on economic and social development of communities within this country.

- 360-655. Automotive Technology for Safety and Driver Education** Credit 3(3-0)

A study of the functional systems of the automobiles as they relate to traffic safety.

- 360-656. Highway Traffic Administration** Credit 3(3-0)

This course is to study the origin of traffic laws, the administration of motor vehicles and the adjudication resulting from traffic offenses. A critical analysis of traffic management procedure: past, present, and future. Also explore the agencies involved with traffic study. (Consent of instructor.)

- 360-657. Traffic Engineering in Safety and Driver Education** Credit 3(3-0)

An investigation of the vehicle and environmental components of the various types

of highway transportation systems. Particular emphasis is given to highway engineering in relation to the flow of traffic in congested and non-congested areas. Traffic studies are performed within the traffic engineering functions, and traffic planning to improve the efficiency of traffic flow and control, and to meet future needs of society.

360-658. Curriculum Integration of Safety Education Credit 3(3-0)

Integration of safety concepts and principles in the kindergarten through grade twelve curricula. Philosophy and psychology of safety; strategies, techniques, and materials appropriate for the various grade levels.

360-659. Motorcycle Safety Education Credit 3(2-2)

Theory and laboratory sessions in motorcycle safety education. Emphasis on laws, maintenance, skills, and safe riding habits and practices.

For Graduate Students Only

360-750. Innovations in Safety and Driver Education Credit 3(3-0)

Workshop or institute dealing with contemporary problems and methods in safety and driver education.

360-751. Psychological Factors in Safety and Driver Education Credit 3(3-0)

A study of psychological variables influencing the driver's behavior. Emphasis on emotional, attitudinal, psychophysical, and social characteristics prevalent in the traffic scene.

360-752. Alcohol and Safety and Driver Education Credit 3(3-0)

Consideration of the psychological and physical aspects of alcohol and its resulting problems on the traffic scene.

360-755. School and Occupational Safety Credit 3(3-0)

Analysis of Occupational Safety and Health Act in the school. Organization and administration of school safety programs including recordkeeping, inspection, building and grounds, facilities, personnel, transportation, materials, and occupational health hazards.

360-756. Seminar in Safety and Driver Education Credit 3(3-0)

Presentation and consideration of safety and traffic education research, issues and problems. Relationships within school, community and related agencies.

360-757. Administration and Supervision of Safety and Driver Education Credit 3(3-0)

Organization, administration, and supervision of safety and driver education programs. Methods of organization, techniques, materials, program planning, records and reports, financing and insurance, procurement, personnel selection, planning and securing facilities.

360-758. Independent Project in Safety and Driver Education Credit 3(1-3)

Study on an individual or group basis in the field of safety and driver education. In consultation with an adviser.

360-759. Thesis Research in Safety and Driver Education Credit 3(3-0)

SECONDARY EDUCATION AND CURRICULUM

Dorothy Prince Barnett, Chairperson

Office: 201 Hodgin Hall

Advanced Undergraduate and Graduate

311-602. Extramural Studies II

Credit 1-3

Off-campus experiences with educational programs of agencies, organizations, institutions or business which gives first hand experiences with youth and adults and aspects of education. Project report and evaluation by permission of department.

311-605. Concepts of Career Education

Credit 3(3-0)

Career Education and manpower concepts in a changing society with emphasis on career awareness, career exploration, and career preparation for kindergarten through the postsecondary level. Development of career education models and evaluation schema.

311-606. Curricular Integration of Career Education Programs

Credit 3(3-0)

Integration of Career Education within subject content areas. Special attention to mathematics, social science, science, humanities, and career-oriented programs.

311-607. Administration of Career Education Programs

Credit 3(3-0)

The organization and implementation of Career Education Programs. Includes methods of models for inservice training for teachers and counselors. Evaluation of Career Education Programs.

311-608. Seminar in Career Education

Credit 3(3-0)

Review of literature, research, issues and problems in Career Education.

311-625. Theory of American Public Education

Credit 3(3-0)

An examination of the philosophical resources, objectives, historical influences, social organization, administration, support, and control of public education in the United States.

311-626. History of American Education

Credit 3(3-0)

A study of the historical development of education in the United States, emphasizing educational concepts and practices as they relate to political, social and cultural developments in the growth of a system of public education.

311-627. The Afro-American Experience in American Education

Credit 3(3-0)

Lectures, discussions, and research in the Afro-American in American education, including the struggle for literacy, contributions of Afro-Americans to theory, philosophy and practice of education in the public schools, private and higher education. Traces the development of school desegregation, its problems and plans.

311-628. Seminar and Practicum in Urban Education

Credit 3(1-4)

A synthesis of practical experiences, ideas and issues pertinent to more effective teaching in urban areas.

311-641. Teaching the Culturally Disadvantaged Learner

Credit 3(3-0)

Psychological and sociological influences on culturally deprived learners and their development; emphasis on the experiential lacks of the culturally deprived learner; and special teaching methods, materials and activities. A consideration of groups of American Indians, Negroes, Puerto Ricans, urban poor, rural poor, Mexican Americans, Mountain whites, and migrant workers who may be culturally deprived.

Graduate Students Only

- 311-700. Introduction to Graduate Study** Credit 2(2-0)
Methods of research, interpretation of printed research data, and use of bibliographical tools.
- 311-701. Philosophy of Education** Credit 3(3-0)
A critical study of and a philosophic approach to educational problems. The nature and aims of education in a democratic society, relation of the individual to society, interests and disciplines, play and work, freedom and control, subject matter and method.
- 311-702. Reading in Modern Philosophy of Education** Credit 3(3-0)
Study and analysis of selected topics in philosophy of education.
- 311-703. Educational Sociology** Credit 3(3-0)
The school as a social institution, school-community relations, social control of education, and structure of school society.
- 311-710. Methods and Techniques of Research** Credit 3(3-0)
Careful analysis and study of research problems; techniques and methods of approach.
- 311-711. Educational Statistics** Credit 3(3-0)
The essential vocabulary, concepts, and techniques of descriptive statistics as applies to problems in education and psychology.
- 311-720. Curriculum Development** Credit 3(3-0)
Basic concepts and modern trends in curriculum development for grades K-12; the purposes, objectives, and programs of the school; the relationship of allied subject areas to curriculum development; the relationship of the community; and the contributions and interrelationships of administrative personnel, other personnel, and lay persons to curriculum development.
- 311-722. Curriculum in the Secondary School** Credit 3(3-0)
Curriculum development, functions of the secondary school, types of curricula; emphasis on trends, issues, and innovations.
- 311-723. Principles of Teaching** Credit 3(3-0)
A study of the status of teaching as a profession in the United States; teacher obligations, responsibilities and opportunities for leadership in the classroom and community with special emphasis on principles of and procedures in teaching.
- 311-724. Problems and Trends in Teaching Science** Credit 3(3-0)
Attention to major problems of the high school teacher of science. Lesson plans, assignments, tests, etc., constructed and administered by each student in class. Audio-visual materials, demonstration and laboratory techniques carried out.
- 311-725. Problems and Trends in Teaching Social Sciences** Credit 3(3-0)
Survey of major problems in the broad field of social studies and consideration of improved ways of presentation and class economy, including lesson plans, assignments, audio-visual materials, and other means of facilitating learning.
- 311-727. Workshop in Methods of Teaching Modern Mathematics for Junior and Senior High School Teachers** Credit 3(3-0)

Model lesson plans, use of educational media, geometric and trigonometric devices, Truth Tables, and intuitive and formal logic in the teaching of modern mathematics in the junior and senior high school.

311-780. Comparative Education Credit 3(3-0)

Historical and international factors influencing the development of national systems of education, recent changes in educational programs of various countries.

311-782. Issues in Secondary Education Credit 3(3-0)

An analysis of the role of the high school as an educational agency in a democracy. Attention is given to: (1) philosophical, psychological, and sociological bases for the selection of learning experiences; (2) contrasting approaches to curriculum construction; (3) teaching methods and materials; (4) evaluation procedures; and (5) school-community relationships.

311-784. Current Research in Secondary Education Credit 3(3-0)

A critical analysis of the current research in secondary education and the implications of such for high school educative experiences.

311-S785. Independent Readings in Education I Credit 1(0-2)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S786. Independent Readings in Education II Credit 2(2-4)

Individual study and selected readings in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S787. Independent Readings in Education III Credit 3(0-6)

Individual study and selected reading in consultation with an instructor. Prerequisite: 24 hours of graduate credit.

311-S790. Seminar in Educational Problems Credit 3(1-4)

Intensive study, investigation, or research in selected areas of education; reports and constructive criticism. Prerequisites: A minimum of 24 hours in prescribed graduate courses.

311-S791. Thesis Research Credit 3

SPEECH AND DRAMA

Mary Moore, Chairperson
Office: 304 Crosby Hall

For Advanced Undergraduates and Graduate Students

610. Phonetics

Broad transcription: The International Phonetic Alphabet; Standards of pronunciation; dialectal variations in America; physiological and acoustical bases of speech sounds. Prerequisite: Speech 250 or Consent of Instructor.

620. Community and Creative Dramatics Credit 3(3-0)

Theory and function of creative dramatics and applications in elementary education; demonstrations with children; special problems for graduate students.

633. Speech for Teachers Credit 2(2-0)

Study and application of the fundamental principles of oral communication related to teaching and learning; speech activities and interpersonal relations identified both

with teaching and learning and the teaching profession; exercises for self-improvement in the various speech processes. Not open to majors in the Department of Speech and Theatre.

636. Persuasive Communication

Credit 3(3-0)

A study of the theory and practice of persuasive speaking in the democratic society, including formal and informal persuasive speaking, types of proof, and the ethics of persuasion. Practice in the preparation and presentation of persuasive messages. Prerequisite: Speech 250.

637. Television Production

Methods and techniques in television production, directing and announcing; program design, lighting, audio, camera, and electronic techniques. Laboratory practice. (Junior and Senior standing required)

638. Television in Education

The uses of television for instructional purposes. Production and preparation of television educational programs. Laboratory practice. (Junior and Senior standing required)

650. Theatre Workshop

Credit 3-6(0-6)

A practicum involving the total theatrical experience. Involves units in acting, directing, stagecraft, designing and other such activities. Approximately 90 clock hours are devoted to technical production. Prerequisite: Senior standing or consent of instructor.

SOCIOLOGY AND SOCIAL SERVICE

Frances Logan, Chairperson

Office: 251 Carver Hall

Advanced Undergraduate and Graduate

SOCIOLOGY

235-600. Seminar in Social Planning

Credit 3(3-0)

Personal and social values as related to social planning; planning and evaluation. Prerequisites: Senior or graduate standing.

235-670. Law and Society

Credit 3(3-0)

This course examines selected and representative forms of social justice and injustices: barriers and opportunities for legal redress, as related to contemporary issues. Prerequisite: Senior or graduate standing.

235-671. Advanced Research Methods

Credit 3(3-0)

Continuation of Sociology 403. Prerequisite: Senior or graduate standing; minimum of 6-9 credits in statistics and/or research.

235-699. Small Groups

Credit 3(3-0)

Elements and characteristics of small group behavior and process. Prerequisite: Senior or graduate standing.

